The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. LXIII, No. 9 CHICAGO, ILLINOIS AUGUST 29, 1914

THE MEDICAL TREATMENT OF CHRONIC INTESTINAL STASIS*

W. A. BASTEDO, M.D.

Associate in Pharmacology and Therapeutics, Columbia University; Assistant Attending Physician, St. Luke's Hospital, New York; Consulting Gastro-Enterologist, Smith's Infirmary; Consulting Physician, St. Vincent's Hospital, Staten Island

NEW YORK

Constipation has appeared under a new descriptive name, viz., intestinal stasis; but it is the recognition of the fact that poisoning may result therefrom that has made constipation and its treatment the subject of renewed interest. Constipation is not necessarily a condition of infrequent defecation, but may be accompanied by one or more daily stools and even diarrhea. This is seen (1) in the so-called "cumulative constipation," in which in spite of daily defecation there is a gradual feeling of accumulation and great benefit from a weekly cathartic; (2) in fecal impaction or fecal tumor, through or around which material finds a passage, though much retarded, or the irritation of which causes diarrhea; (3) in Boas' "fragmentary constipation," in which there is a constant consciousness of feces in the rectum, but no relief from repeated attempts at defecation, these resulting merely in the passage of one or two fragments now and then, and (4) in the condition in which, in spite of one or more daily stools, occasional hard, foul-smelling masses are passed.

A review of the treatment of chronic constipation might very properly be preceded by a discussion of the causative factors of the condition; but I shall omit this discussion, because I intend to confine my remarks to the treatment of those cases of chronic stasis with no discovered anatomic or pathologic condition to which the stasis may be attributed. These constitute the great majority of stasis cases, and are seen every day by the physician.

Measures for relief in such cases of chronic intestinal stasis include: the formation of good defecation habits, prompt response to the desire to defecate, exercise, massage, support of the abdominopelvic walls, foods, water-drinking, softening agents which increase the bulk of the feces, cathartics, suppositories, enemas and surgical intervention.

1. *Habit Formation.*—This is the establishment of a regular time for the daily stool. The best time would seem to be just after breakfast, because the morning activities and the taking of food both favor colon peristalsis. By the Roentgen ray Hertz noted a perceptible advancement of the colon contents after each meal, and this was most marked after breakfast. Cash noted the increased movement after exercise. Even when there is no desire to defecate, the attempt should be made; for the voluntary effort may force some feces into the rectum and so result in the regular defecation reflexes, and the passage of a stool. Good habits also include proper attention to the act itself, for failure to defecate may result from the concentration of the mind elsewhere, as on some interesting book or newspaper.

2. *Response to Desire.*—In those who do not go to the water-closet when the desire comes, the feeling tends to pass away, and the fecal matter remains in the rectum without arousing further desire to empty the bowels. If this is often repeated the rectum loses its sensitiveness. Hence, rectal insensitiveness is a cause of intestinal stasis in those who habitually suppress the desire to defecate. Such are dentists and other professional people, women in business who have to pass a number of men to reach the water-closet, those who have access to filthy closets only or are subject to inadequate facilities, etc.

3. *Exercise.*—It is generally understood that bodily activity is sufficient to ensure good bowel movements. Yet we have encountered a number of athletes and active persons who were constipated, and some who led very sedentary lives and yet had daily copious stools (the latter are usually large eaters). Other things being equal, however, exercise tends to promote defecation, both by creating rapid changes in intra-abdominal pressure, and by increasing the appetite so that more food is taken and the food residue in the bowel correspondingly increased. Any active exercise may be prescribed, such as brisk walking, running, rowing, horseback-riding, tennis and golf, all of which are done in the open air, or dancing and gymnasium and home exercises, which are taken indoors. Simple daily exercises of benefit may be taken in the lying or standing position. Those to be taken in the lying position might be: lying on the back and raising the legs, one at a time and both together to a right angle with the trunk, raising the trunk to a right angle with the legs, etc. Those taken in the standing position might be: bending forward, knees stiff, till the fingers touch the floor, and then backward as far as possible, the hands being raised above the head; bending far over to one side and then to the other; rotating the body on the hips, the arms being extended; alternately raising the knees till the thigh hits the abdomen, etc. These exercises should be performed in a quick and positive manner, and not in a dilatory way. Troublesome exercises, and difficult postures such as the Trendelenburg and knee-chest, are seldom persisted in by the patient for any length of time.

* Read before the Section on Pharmacology and Therapeutics at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

4. *Massage.*—This may be a helpful measure when the manipulation of the abdomen is done by some one with general anatomic knowledge and special information about the abdominal organs of the patient under treatment. It should not be instituted if there is any suspicion of a duodenal ulcer, a chronic appendicitis or other inflammatory condition. The bladder should always be empty. The massage may be either superficial or deep. It may be performed by kneading, by a rotary motion in which the abdominal wall slips over its contents, by a rapid vibratory motion, or by rapid slapping with the edge or flat side of the hands, always with a general movement in the direction of the colon. It may be given with a mechanical vibrator. Self-massage may be carried on by rolling a cannon ball, or ball of clay covered with chamois skin or leather, or a wooden ball filled with shot, over the abdomen in the direction of the colon.

5. *Support of the Abdominopelvic Walls.*—In defecation, normally the anterior abdominal muscles, the diaphragm and the pelvic floor contract or are set so as to raise intra-abdominal pressure. In most cases with ptosis of the viscera, however, not only do the weak abdominal muscles fail to make pressure, but also, by allowing the viscera to fall away from the diaphragm, they deprive this latter of its usual resistance. It is therefore difficult to raise intra-abdominal pressure. Hence an inelastic support extending around the body and from navel to symphysis should be applied the first thing in the morning and worn till bedtime. In addition, if there is laxity of the pelvic floor, this should be attended to by a pessary or the necessary surgery.

6. *Foods.*—So far as their effect on the bowel movements is concerned, foods might be classed according to the chemical substances they contain, and the amount and character of their residue. They tend to promote peristalsis: (1) by increasing the bulk of the intestinal contents, as by their structural parts such as cellulose, skins, etc., and by unabsorbed oils and fats; (2) by mechanical irritation, as by seeds or husks; (3) by chemical action, as by sugars and fruit acids and their salts, and digestive products, such as soaps, amino-acids, etc.

It goes without saying that those who habitually undereat will be constipated; in fact, simple undereating is a frequent cause of constipation. The same is true of those who habitually eat food that is too readily digested. In either case the residue is insufficient. Therefore, abundant mixed meals usually favor bowel movements. For residue, cellulose, as furnished by fruits, vegetables, and other plant products is of very great importance; in fact, Rubener states that in the absence of cellulose almost everything is absorbed. Substances rich in cellulose pass into the intestines as paste and stimulate peristalsis, while meat, eggs and milk pass along as liquids, and so favor segmentation, but not peristalsis (Cohnheim). The products of the latter type are then rapidly absorbed and leave but little residue. Hertz reports that of the dry substance of meat, eggs, white bread and rice, only 5 per cent. appeared in the feces; while of the dry substance of green vegetables and brown bread 15 per cent., and of the dry substance of carrots and turnips, 20 per cent. was recovered. The feces of a mixed diet gave 100 gm. of water and 35 gm. of dry substance; the feces of a vegetable diet, 260 gm. of water and 75 gm. of dry substance.

Vegetables and salads mostly contain much fibrous tissue and cellulose. Many of them should be quite as much esteemed for the residue they leave for the bowels as for the nutritive matter they furnish for absorption. Such are lettuce, spinach, carrots, parsnips, oyster-plant, turnips, cabbage, cauliflower and squash. The salad dressing may be a means of furnishing abundant oil, which tends to be laxative.

Farinaceous foods include the cereals, the starchy vegetables, such as potatoes, and foods made with flour, such as bread. The cereals contain more or less cellulose. Oatmeal is especially laxative, because of the presence of indigestible husks and excessive cellulose and fat. It is often taken in the form of crackers. White bread leaves very little residue, but bread, biscuits and crackers made of graham flour, or containing bran, leave a large residue and tend to be laxative. It is to be remembered that graham flour is made by grinding the whole of the wheat kernel, bran and all, and is not bolted, so that it contains coarse particles. The so-called whole-wheat or entire-wheat flours have a portion of the bran removed and are bolted, but are coarser than white flour.[1]

Fats tend to be laxative largely because of the soaps which are formed from them in the intestines. They may be given in the form of cream, butter, olive oil, etc. It goes without saying that the greater their nutritive power the less is their laxative effect; for if they are absorbed they do not pass on to the colon.

Fruits contain sugar, cathartic acids or salts, indigestible structural parts (fiber, cellulose, skins, etc.), seeds and non-absorbable colloid pectin bodies. Those most frequently considered laxative are prunes, figs and dates; but an apple, an orange or some grapes at bedtime or before breakfast will often insure the morning stool. Of this latter group, the acids and salts belong to the saline cathartic class. In young children one or two teaspoonfuls of orange-juice may be an effective stimulant to the bowel, its acid changing in the duodenum to the laxative sodium citrate.

Fruits and other coarse foods have the great disadvantage that they tend to promote gastric hyperacidity and flatulence. In obstructive or spastic types of constipation they may impede the action of the bowels, or may even form a food ball in the intestines. In one case, Coerr[2] removed from the ileum a ball which weighed 945 gm. and was composed of cereal husks, fruit seeds and other plant parts. In a number of instances we have found that the bowels acted better when the patient stopped fruit-eating.

7. *Water-Drinking.*—In those who live on a dry diet constipation is the rule; but the converse is not true, for the ingestion of large quantities of water does not make the bowels move. In two normal cases and six cases with chronic nephritis, we observed the effects of the administration of 8 ounces of water each hour for fifteen hours daily for one week. That was 7½ pints of water a day by mouth. In the normal cases the only noticeable effect was increased urination, the bowels not showing any increased activity. In the kidney cases the only observed effect was edema, neither the kidneys nor the bowels being appreciably increased in activity. As a matter of fact any excess of water is normally absorbed from the intestines with rapidity, and in any but kidney cases it serves to activate the kidneys rather than the bowels. Such absorp-

1. Bull. 143, U. S. Dept. Agric.
2. Coerr, F. D. H.: Enteroliths, The Journal A. M. A., Dec. 20, 1913, p. 2238.

tion of water may, however, be greatly retarded by the solution in the water of salts containing poorly absorbable ions, such as the saline cathartics, or by substances in the digestive canal that hold the water, such as agar-agar (See next paragraph). And since, in order to keep the feces of a soft consistency, the food residue must hold a certain amount of water, the drinking of a reasonable amount of fluid should be prescribed for those who habitually underdrink.

8. *Medicinal Agents Which Give Bulk and Soft Consistency to the Feces.*—The more commonly employed ones are: agar-agar, liquid paraffin, and small (not expulsive) doses of the saline cathartics.

1. Agar-agar absorbs water and increases greatly in bulk, so that it softens and enlarges the fecal mass. It is not absorbed unless changed bacterially, but it has the disadvantage that if it is not carried out, it forms a most excellent culture medium for the growth of intestinal bacteria. It is not a very effective laxative and usually requires the addition of a little phenolphthalein or cascara. Used in a similar manner are flaxseed and psyllium seeds, which absorb water, become mucilaginous, and increase the fecal bulk. They serve the purpose of making the bowels move, but they are very subject to fermentation, with the development of gas in the intestines.

2. Liquid paraffin (petrolatum liquidum) is a remedy that has been extensively employed since it was called to the notice of the profession by Sir Arbuthnot Lane. It is a viscous liquid that is not at all changed chemically and not at all absorbed from the alimentary tract, as shown by Bradley, 1911, and by Bloor, 1913, hence it serves to soften and to increase the bulk of the feces. It is also believed to be strictly non-irritant. Whether or not it exerts in the bowel a disinfectant effect on some of the strains of fecal bacteria has not been demonstrated. Finch and others have shown that it lacks disinfectant effect, but that, by virtue of its viscous and oily nature, it acts as an agent which retards the growth of bacteria implanted in it, but this does not serve as a test of its antibacterial value when mixed with food residue in the ileum or colon.

The refined oil is almost tasteless, is readily swallowed without any added flavor, and in doses of from 1 to 3 ounces a day is a mild but often efficient laxative. On account of its oily nature, it should not be taken just after meals, but preferably when the stomach is empty, that is, about an hour before lunch and dinner and at bedtime, for the oil will retard gastric digestion and prolong the emptying time of the stomach. In some cases, especially those in which the stomach-emptying is already retarded, the oil is not well tolerated, causes nausea or regurgitation, and has to be stopped. In others of the chronically constipated, the oil leaks from the anus so that it greases the clothes, yet without giving a proper stool; or it passes down as free oil without admixture with the food residue. In these cases reduction of the dose of oil and persistence in its use may meet with the desired result, but a small dose of another laxative, such as cascara, may be necessary.

On account of its recent extensive use as an internal remedy, a few words in regard to the quality and properties of this oil may be in order. It is quite generally asserted that the Russian oil is superior to the American for two reasons: (1) the absence of the harder paraffins, and (2) the absence of members of the olefin series of unsaturated hydrocarbons. But in the best American oils the paraffins are removed by chilling, and according to Sir Boverton Redwood, in his extensive work on petroleum, there is no sufficient evidence that the unsaturated hydrocarbons of Pennsylvania petroleum are olefins, and that, in any case, if there are any present they are readily removable by strong sulphuric acid. Redwood further states that "comparison of results obtained with American, Galician and Russian petroleum shows that the same classes of hydrocarbons—the paraffins, the polymethylenes or naphthenes, and the aromatic hydrocarbons—are present in the petroleum from all three sources, but that the relative amount of naphthenes and in all probability of aromatic hydrocarbons is greatest in Russian and least in American petroleum." Marcusson[3] claims that, of stable saturated hydrocarbons which react with fuming nitric acid, the Russian oils contain a higher percentage than the American oils. There is obviously some difference between the Russian and American oils, but in the well-refined products the difference is not marked.

As a matter of fact, after a certain fraction of petroleum of the specific gravity desired has been obtained by repeated fractional distillations, the regular process of refining is to subject it to the action of strong sulphuric acid, then caustic alkali, and then water for thorough washing. A stream of dry air carries off the water. In some instances the oil is filtered through diatomaceous earth or bone-black. This refining process must be repeated many times, indeed as often as fifteen or sixteen times, perhaps, and it correspondingly increases the expense of production.

The proposed text for the Ninth Revision of the U. S. Pharmacopeia describes "liquid paraffin" as free from fluorescence, without odor or taste, and not acted on or colored by concentrated sulphuric acid or nitric acid in the cold. The British Pharmacopeia specifies that when the oil is mixed with an equal volume of sulphuric acid in a test-tube and placed in boiling water for ten minutes with frequent agitation, the color of the separated layer of acid should not be of a deeper tint than pale brown.

I have tested a number of oils on the market. Of nine samples which have been mixed with an equal volume of sulphuric acid, a portion not having been heated, and a portion having been heated on a water-bath for ten minutes, nearly all fail to come up to the requirements. Three of these samples are American and are fluorescent. The others are sold as Russian oil. Obviously the oils on the market are of very poor quality.

We do not yet know whether, when used internally, an oil is or is not harmful if it is not fully refined; but till we do know, it is the part of wisdom to demand only the very best.

In regard to the specific gravity of these oils, it would seem that the more viscous oils, those of specific gravity from 0.880 to 0.890, are the ones of choice. I have been of the belief that lighter oils than this were likely to pass through the bowel without satisfactory admixture with the feces; but in a study of this subject, I find that there is no rule about it, and that at times in certain patients, the heavier oils as well as the lighter will give a stool of pure oil or will leak from the anus. The question of the requirement of a high specific gravity must, therefore, remain an open one.

3. Marcusson: Chem. Ztschr., 1912.

The more solid paraffin preparations, such as white petrolatum have also been employed in the form of a flavored and usually colored jelly. They are apparently just as active as the liquid preparations.

3. Of the saline cathartics, the softening doses are smaller than the usual expulsive doses; for instance, 1 or 2 drams of magnesium sulphate or milk of magnesia are given at bedtime, or morning and night. They act by retarding the absorption of water and so increasing the amount of water that reaches the colon. This prevents too great concentration of the feces in the colon. The larger expulsive doses of saline cathartics should not be used daily for any length of time, for they bring about a "peristaltic rush" for one or two hours only, and accustom the bowel to an entirely abnormal action.

Of the anthracene cathartics, senna, rhubarb, cascara, aloes, aloin and phenolphthalein, little need be said, for they have been prescribed with great benefit by the profession for many years.

At times the use for a few nights of an injection of one pint of warm olive oil to be retained through the night, together with one of the softening agents by mouth, will have a wonderful effect in starting the bowels on a new line of activity. Indeed, a number of the chronically constipated referred to us for advice as to the need of surgery, have apparently completely overcome their chronic stasis by this treatment. Sometimes it is wise to renew the oil injections for about one week in each month.

Having thus reviewed some of the simpler remedies, we might sum up the treatment of chronic intestinal stasis as follows: Regularity of defecation, measures to improve intra-abdominal pressure, measures to increase peristaltic activity, and measures to increase the bulk and softness of the colon contents. In the average case attention to habits of life and to the amount and kind of food, and the administration of a softening agent or a very mild laxative will be effective in overcoming the stasis, and, therefore, the toxemia. In severe cases, the addition of an oil enema at night may work a marvelous change for the better. In these chronic cases the drastic cathartics should be omitted from use.

If measures such as those spoken of, when carried out thoroughly, do not overcome the stasis and the toxemia, the question of surgery should be seriously considered.

57 West Fifty-Eighth Street.

ABSTRACT OF DISCUSSION

Dr. T. F. Riley, New York: This question of intestinal stasis every practitioner must face. One or two points with regard to constipation may be mentioned. Many people who drink beer at night have free movements in the morning; light beers produce this, also buttermilk. Whether it is due to the liquid or to acid fermentation is a question. Chronic constipation is sometimes due to tightened sphincter. One should always examine the rectal sphincter. Its dilatation in children and infants will often cause the child to have a regular daily movement. In adults the use of dilators is often successful in producing these results. Bran is now popular, but, in its ordinary form, it becomes wormy and filled with vermin during the summer. A number of firms are putting out sterilized bran. I believe the large quantity of sulphur contained in the American mineral oil is distasteful to the patient. Whether a patient is benefited by the use of the oil or by the cathartics of the cascara series is a question. It is more disagreeable to take the oil than the tablets and the results do not warrant the use of the oil in preference to the tablets in many cases.

Dr. George Parker, Peoria, Ill.: Does or does not phenolphthalein produce albuminuria?

Dr. Robert A. Hatcher, New York: How about aloin used alone? We know that belladonna or atropin in small doses stimulates the vagus in the splanchnic area and there is a secretion in the pancreas which is due to this stimulation, and if atropin has this activity then it should have just as great an action on the liver. I would say that a good specimen of aloin is just as good as aloin, belladonna and strychnin. The specimen, however, must be good.

Dr. W. A. Bastedo, New York: I never heard of any special effect of beer on the bowels. I did not include consideration of the tight sphincter, as when there is such an obvious reason for constipation as that we should find it out. In normal people there are no feces in the rectum, or only a few remnants. When there are feces in the rectum and the patient is not cognizant of the fact, then we have a troublesome condition with which to deal. There is usually atony of the walls as well as lack of sensitiveness. Replying to Dr. Hatcher, in a number of instances I have tried aloin pills and aloin, belladonna and strychnin pills on the same patient, and the simple aloin pills did not work so well. It is true there is sulphur in the American oil, but this is not the cause of the excessive darkening with sulphuric acid in these samples. Undoubtedly the American oils are less well refined than they might be, for the samples shown are the best oils available on the American market. Two of them also are fluorescent and according to the pharmacopeia should not be used. Rowntree found that when phenolphthalein was given by the mouth it was not found in the urine, but when given hypodermatically it was excreted by the kidneys. I have noted that, at times, in patients taking only laxative amounts of phenolphthalein by mouth, the urine will at times turn pink on the addition of alkali. This would indicate some absorption with excretion by the kidneys. It does not cause albuminuria.

INTERNATIONAL STANDARD FOR TESTING VISION AND STANDARDIZING OTHER VISUAL TESTS*

EDWARD JACKSON, M.D.
DENVER

The cards of test-letters in common use are admirably adapted to the subjective determination of errors of refraction; but as a test for visual acuity they probably afford the poorest and most inexact standard on which any scientific observations are now based. As a standard for visual acuity, test-letters belong to the stage of mental and scientific development when the standard for length was "three full grains of barley corn taken from the middle of the ear," or "the distance a man can walk between sunrise and sunset."

As a help in the subjective measuring of refraction they are superior to any substitute that has been proposed and are not likely to be given up. But as a scientific standard they possess two essential defects:

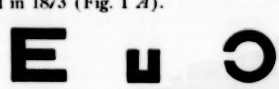
1. The different letters when made as uniform as possible are visible from very different distances. This makes them unsuitable for a scientific standard.

2. They can be readily committed to memory by all who are sufficiently familiar with them to make them a convenient test. This lessens their value as a practical test.

* Read before the Section on Ophthalmology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

For these reasons test-letters should be standardized before they are used as a basis for records of visual acuity, and they should not be used when testing visual acuity is the only purpose to be served.

Every one who has attempted to establish a scale of test-letters has been struck by their differences in visibility. When Snellen attempted to make letters uniform by using a block-letter in which the lines and minimum spaces should have a uniform width, subtending a 1-minute angle at the standard distance, each letter to occupy a 5-minute square, he rejected as unsuited to the purpose the letters I, J, M, Q, W and X. Green carried the process farther, rejecting twelve letters and using fourteen. Oliver used only seven, but he still admitted letters that varied as much as 40 per cent. in visibility. The logical conclusion was reached only when a single set figure was adopted as the test, as in Snellen's optotypes for the illiterate published in 1873 (Fig. 1 *A*).



A B C

Fig. 1.—*A*, Snellen's optotypes. *B*, Jackson's incomplete square subtending an angle. *C*, Landolt's broken ring.

Before this section at the Nashville meeting in May, 1890, I proposed the simple form of the incomplete square, subtending an angle of 3 minutes (Fig. 1 *B*); in 1889 Landolt had suggested the broken ring (Fig. 1 *C*), and at Naples in 1909 the International Ophthalmological Congress adopted the broken ring as an international standard test for visual acuity, the most important official action that has ever been taken by an international ophthalmological gathering. Either one of these tests furnishes an exact measure for visual acuity, so far as visual acuity is capable of exact measurement, and one enormously superior to any furnished by letters, numerals or any series of conventional figures.

The difficulty of using a series of differing figures for a scientific test has been encountered by every one who has attempted to arrange a series of test-type, but few have appreciated the impossibility of an accurate standard of visual acuity resting on such a basis. In

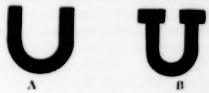
Fig. 2.—One of Dennett's lines of test letters. All about equally visible at 20 feet.

1885 Dennett[1] read before the American Ophthalmological Society a paper on test-type in which this unsuitability of letters to furnish a standard test was well brought out. More recently it has been illustrated by the work of Gebb and Löhlein.[2] Dennett took the block-letters of the forms used in Monoyer's test-card, and found that letters 25 mm. in height could be recognized at distances that varied from 10.3 meters for the B and S, to 17.7 meters for U. He analyzed the differences of visibility and proposed and arranged test-cards in which the letters of each line should all be visible at nearly the same distance. To show how different such a test is from those we are accustomed to rely on, a line from one of these cards is reproduced in Figure 2.

1. Dennett: Tr. Am. Ophth. Soc., 1885, iv, 133.
2. Gebb and Löhlein: Arch. f. Augenh., 1910, lxiii, 69.

So far as I know Dennett's tests have never been extensively used. While they would be superior to any other published series of test-letters for the scientific testing of visual acuity, they are not quite equal to the international standard for this purpose, and are distinctly inferior for the other purpose for which test letters are employed, the subjective determination of errors of refraction.

It would be absurd to spend time arguing the unfitness of letters as ordinarily printed on our test-cards for making scientific measurements, if they were not almost universally employed for that purpose. To use a tape measure that would spontaneously contract to 20 inches or stretch to 36 inches would be an absurdity of the same order as to use as equivalents letters, some of which can be just recognized at 20 feet and others at 36 feet, calling them all 20-foot letters.



A B

Fig. 3.—Different forms of the same letter inscribed in squares of the same size, subtending an angle of five minutes at about 20 feet.

Such is the variability of letters of a single style used on a single card. The recognized forms of letters, even of capital block-letters, to be found in a well-equipped printing establishment, run into the hundreds. Three or four fairly distinct types of block-letters are in use on our test-cards. The differences of visibility vary with all these different forms. One firm has put out test-cards on the five-minute basis and others on a four-minute basis. The letters on the latter, although only four-fifths the height, can be seen quite as far as those on the former, because they are of simpler form. The block-letter U, if made as at A in Figure 3, can be recognized 50 per cent. farther than if made as at *B* in Figure 3. When to these differences in the letters of the roman alphabet are added the myriad differences of the different alphabets of the world, the *reductio ad absurdum* of testing visual acuity by letters becomes complete.

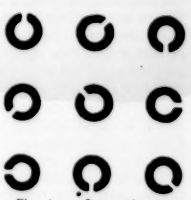


Fig. 4. — International test. With normal vision, the direction of the break in the ring can be recognized at 5 meters.

In contrast with this take the mathematical exactness and constancy of the international standard test. If one always used the same test-card and could have the same letter or letters of equivalent visibility on every line of the card, it would be possible to obtain records of practical accuracy for individual use. As this is not done, when of different visibility, the test-letters fail us even in this practical service. I have a test-card in which the letters are so chosen that the 6-meter line is quite as easy to read, perhaps is more often read correctly at the same distance, than the 7.5-meter line on the same card.

Our test-cards become brown with age, or worn out, and often are not exactly replaceable. I doubt if I could get now, without having them especially made, samples of any of the test-cards used in my first five

years of practice. There are advantages in using different test-cards in testing the two eyes, or in testing the same patient on successive days, and as the different cards have different series of letters to be recognized at the same distance, the practical result is that all records of visual acuity made with test-letters have a very indefinite significance, even in the practice of one surgeon. When it comes to comparing the work of different men, especially in different parts of the world, the practical value of records of such visual acuity is greatly impaired. If the 6-meter line is easier to read than the 7.5-meter line, what do we learn when told that at one visit the patient read most of the 7.5-meter line, and then under treatment he read a week later all of the 6-meter line?

So much for the first objection to test-letters. The second objection is of equal practical importance. It has not been very rare for men required to pass visual tests for a government or railroad service to obtain a copy of the test-card used and commit the letters to memory and thus pass the usual examination without possessing the required visual acuity. Many ingenious contrivances have been devised to prevent such evasions of the test. William Thomson arranged radiating lines of test-letters on a circular card, only one of which lines could be exposed at any one time. Yet a person obtaining a card and memorizing the lines could repeat the smallest letter from his recognition of the largest. Grow[3] devised a test-card which he called unlearnable, having sixty letters all of the standard 20-foot size, of which only a single line was exposed in such a way that the observer himself could not know which line was in use except by reading it.

Burch[4] wrote, "It is astonishing how soon the exact description of a test-card becomes known if many people from the same neighborhood are tested." For the confusion color-test of vermilion letters on a green ground, he advises that the examiner keep paints of the right colors, and paint in new letters for any individual case. The late Dr. George C. Harlan used to tell of a schoolboy who, tested one day with an ordinary test-card of Snellen letters, was able next day to repeat the whole card correctly from memory. The caution sent out with cards for testing schoolchildren, to keep the test where the children will not have a chance to see it, is quite necessary. Probably all of us know without looking at the card the succession of letters on any test-card that we have used much, and the element of memory renders a patient's answers unreliable after a letter has once been recognized, so far as that letter is concerned.

So long as the vision has improved by a change of glasses and progressively smaller or more difficult letters can be read, the ordinary letter or numeral test-card serves its purpose most admirably; but when it is used simply to ascertain the maximum visual acuity, the chance of remembering the letter, instead of seeing it, is a serious drawback. This chance is not confined to letters or numerals. It applies to all cards of test-figures that cannot have their directions or relations changed at will.

Here lies the great advantage of the incomplete square or the broken ring. As was pointed out twenty-five years ago by Landolt, and a few months later independently by myself, if the card on which one or more of these tests are symmetrically placed is simply turned, it becomes impossible for the person tested to know, except by sight, in what direction the incomplete side is placed. By using a single broken ring or a symmetrical group of them printed on the center of a symmetrical card, the same card can be used for any number of repetitions of the test, without giving any hint of the correct answer, except by vision sufficient to recognize the figure.

This manner of using such a test makes it impossible to have a single card with a whole series of broken rings of different sizes printed on it. But one size can be placed on each card. The same amount of cardboard cut into the proper pieces can be made to furnish an equally complete series. When a large number of persons are to be tested, the best plan is to use a single test of a certain standard size. This is to be looked at first from or beyond the standard of distance. Then the person to be tested should gradually approach the card, until the direction of the break is recognized.

For instance, in testing a class of schoolchildren, the test should be shown to the whole class and its use explained. Then the children should be sent beyond the standard distance and each one made to approach until the break in the ring is recognized. If we take the standard distance of 5 meters, recommended by the International Ophthalmological Congress, and mark it off on the floor in 0.5-meter spaces, or double this distance and mark it in whole meters we can, at a glance, ascertain the visual acuity in tenths. It is true that theoretically the variable distance introduces a minute inaccuracy through varying divergence of the rays from the test object; but this theoretical inaccuracy has no practical importance, and is so extremely minute in comparison with the inaccuracies that we have every day tolerated in connection with the use of test-letters that it may well be disregarded. What is meant by a symmetrical group of broken rings is illustrated in Figure 4.

The rings may be arranged in squares as 1, 4, 9, 16; or any number may be arranged in circular form. I believe that as its advantages are appreciated, the international standard test will come into universal use for the simple testing of visual acuity.

The international test, however, does not so directly help us in the problems of the consulting-room in practically determining and recording the visual acuity obtained by use of test lenses, a very important part of our daily work. In this work series of test-letters arranged in graduated sizes will hold their own against any other method of testing visual acuity that has yet been suggested.

With our ordinary cards of test-letters the practical accuracy of the international standard can be easily attained by the very simple expedient of numbering each line of letters by its equivalent value as compared with the international standard. For instance, instead of calling the 5-meter line a 5-meter line or a 16½-foot line, if it contains some of the more difficult letters, like B or S, number it 1, as expressing full vision according to the international standard. At the same time if half the letters on it can be read by an eye having vision of only 9/10 by the international standard, also indicate this on the card; half the letters equal 9/10, all the letters equal 1. If one or two letters can be recognized by a person having 8/10 vision, that fact might also be indicated; but practically it will usually be best to give only the two values; one value for a certain portion of the letters, as 1/2, and the other the acuity indi-

3. Grow: Ophthalmology, 1911, vii, 195.
4. Burch: Ophthalmoscope, 1912, x, 320.

cated by reading every letter on the line. In a word, we must standardize our cards of test-letters. When this has been done it is just as easy to read the standard of visual acuity indicated from the card used as to read the old meters or feet printed with each line to indicate the distance at which it was supposed letters of that size should be visible.

With the test-card standardized, we can use any arrangement of letters we choose, and as many different arrangements as we choose. We can employ one card one day and another the next day or the next month, or after twenty years, and still know that the comparisons of visual acuity are accurate. Each nation may test vision by cards suited to its own convenience. Illiterate test-cards of any sort may be employed, and if properly standardized the results will be perfectly comparable.

This matter, simple as it is, is one of great practical and scientific importance. It is entirely worthy of the careful attention of every association of scientific ophthalmologists. To standardize the cards already in use, and to bring the matter properly to the attention of those who publish such cards, it is suggested that this Section appoint a committee, and that every member of this Section should cooperate with that committee to secure the best possible standardization of all test-cards in common use.

Majestic Building.

ABSTRACT OF DISCUSSION

DR. NELSON M. BLACK, Milwaukee, Wis.: As stated by Dr. Jackson the test-letters, even when conforming exactly to the five-minute angle of Snellen, afford the poorest and most inexact standard on which any scientific observations are now based. The statement, "As a help in a subjective measuring of refraction they are superior to any substitute that has been proposed," is also true, but is it not the result of the majority of us having been willing to accept the results of Snellen's observations, and our own fatal tendency to let so-called well-enough alone? Some of the reasons why different letters are visible from different distances may be of interest, and are well covered in the conclusions of Miss Roethlein's most interesting paper, "The Relative Legibility of Different Faces of Printing Types" (Publications of the Clark University Library, Jan. 12, 1912.)

There are other reasons in addition to those given by Dr. Jackson why test-letters should be standardized before they are used as a basis for records of visual acuity. The fact that certain letters of say the 6/VI line are more easily recognized than others at 6 m. frequently gives rise to comments from the patient, such as, "Why am I unable to see all the letters on the line with equal clearness?" and in the absence of the knowledge that the visibility of different letters varies with the distance, gives rise to an idea that perhaps they are not receiving the best correction of their refractive errors. This phase of the subject deserves at least some consideration as well as the factor of the non-uniformity of the results obtained at examinations made at different times and those made by different individuals.

That the letters on the standard test-cards can be easily committed to memory by all who are sufficiently familiar with them lessens their value as a practical test, is a defect which would still exist in the event test-letters were standardized to equal visibility at the same distance. This, however, may easily be overcome by having several cards with the letters arranged in different order and with but one line of letters on each card.

In the use of the international tests some questions arise which may or may not be of importance; for instance, the examinee is informed that the test consists always of the same thing, that is, to designate in which direction the break in the ring exists and that the position of the break in each ring differs from all the others. Will such knowledge cut down or increase the possible ratio of correct guesses? We all know how frequently, in refraction, patients will call the letter O, G or C or Q or the letter C, O or G or Q. The frequency of this mistake varies with individuals, also with the kind and degree of refractive error. Another question which suggests itself is, Will the fact that the break in the letters C and G is, and always has been, toward the right be a factor in increasing the visibility of the international test-rings in which the break in the circle is toward the right, either above or below the horizontal, as a result of constant association? A third question which should be determined is, What effect on the visibility of the break in the rings will various degrees of astigmatism at various axes have? The ability of the normal eye to distinguish the form of an object depends on: 1, the size of the image received on the retina; 2, the amount of light reflected from the object and its background; 3, the contact between the object and its background.

Dr. Jackson's paper deals largely with the first factor, but there are two remaining factors to be given serious consideration before we can arrive at uniformity in the test for visual acuity.

DR. EDWARD JACKSON, Denver: The idea of standardized letters is this: We must have the letters to do our refraction work. When the refraction work is done, when we have the best lens, we want to record the visual acuity. Now the thing is, from the card we have been using to be able to put down the visual acuity. The way in which this may be done is illustrated by the use of the cards I called attention to yesterday. Instead of giving 6 meters for the first line of letters—that is the distance at which they would be placed in the Snellen scale—this card is prepared for use at 5 meters. The reading of that whole 6-meter line represents 8/10 vision; the reading of the easier letters of the line represents 7/10 vision, as compared with the international standard. After such a card has been used you have the vistual acuity according to the international standard, instead of rating V-6/6 or something of that kind. That is the reason for having the standard visual acuity printed on the test-card; it would enable us to standardize our records of visual acuity. With reference to another point of illumination and of background that Dr. Black referred to, the placing of the international broken ring at the end of each line of this card was done with that in view. In comparing the test letters with the international standard we have them on the same card and used by the same light, and if we have taken the proper precautions in standardizing the cards, we will have no difficulty in getting at the true visual acuity.

CONVERGENCE INSUFFICIENCY*

ALEXANDER DUANE, M.D.
NEW YORK

Convergence insufficiency is a frequent anomaly. Probably 8 per cent. of our eye patients show some degree of it, and this proportion would certainly be increased if every patient that presented himself were carefully tested. This statement by no means implies that in all or even a majority of these cases the convergence insufficiency is responsible for the symptoms. On the contrary, in a great many instances convergence insufficiency — especially the accommodative form — seems to cause no trouble whatever. Still it does cause trouble often enough to make it important for us to consider carefully its causation, varieties and treatment.

* Read before the Section on Ophthalmology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

In considering a condition like this it is obviously essential that first of all we should have clear ideas of its nature. We may start, therefore, with a definition and say that convergence insufficiency is a condition the distinctive feature of which is that the eyes converge imperfectly or with difficulty, the disability not being due to impairment in power of the internal recti *per se*. It is, in other words, an anomaly of a coordinate movement of the eyes and not of the eye muscles, and as such it is in all ordinary cases a strictly binocular affection, each eye being equally involved.

DIAGNOSIS OF PURE CONVERGENCE INSUFFICIENCY

A pure case of convergence insufficiency presents the following features:

1. Deviation for distance little or none.
2. Prism divergence (abduction) not excessive.
3. Prism convergence (adduction) subnormal and difficult.
4. Exophoria for near points marked and increasing with approximation of test-object.
5. Convergence near-point abnormally remote.
6. Lateral movements of each eye inward and outward normal in extent and comitant.
7. Diplopia, if present, not increasing to right or left.
8. Convergence reaction of pupil deficient or absent.

These signs deserve a brief consideration.

1. *Deviation for Distance.*—In pure convergence insufficiency there is rarely more than a centrad of exophoria for distance. Not infrequently there is orthophoria, and occasionally even a centrad or so of esophoria. Even when the convergence insufficiency is beginning to be complicated by a divergence excess so that there is more or less exophoria for distance, this is moderate in amount and always much less than the exophoria in near vision.

The tests for distance should be made both with and without the patient's distance-glasses in order to determine the effect that the latter have on the deviation.

2. *Prism Divergence.*—The prism divergence (so-called abduction) for 5 or 6 meters ranges in general from 3 to 8 (in most cases from 4 to 6) centrads. It corresponds, therefore, to the normal. In some cases it may even be subnormal. When the prism divergence is 9 centrads or over, the condition is no longer a pure convergence insufficiency, but is complicated with a divergence excess. There is then usually a more or less considerable degree of exophoria for distance.

3. *Prism Convergence.*—The prism convergence (so-called adduction) for 5 or 6 meters is often low (varying from 6 to 12 or 14 centrads). Low prism convergence in itself means nothing abnormal, since many persons with normal convergence are unable at the start to overcome prisms, base out, of more than 10 or 12 centrads. In such persons, however, it is evident that this inability is due to lack of facility rather than lack of power, and when they once learn, which they do after two or three trials, they go steadily and easily upward, so as ultimately to overcome prisms of 30, 40 and 50 centrads. Moreover, when they can overcome a prism at all, they can hold the images together without difficulty. In convergence insufficiency, on the other hand, it often happens, particularly in the serious and troublesome cases, that the patinet who can overcome, say, a 12-centrad prism, can only with difficulty and strain pass from this to a 14-centrad; and even when he unites the images with the higher prism, he cannot hold them together for more than a moment. In extreme cases of this sort the inability to overcome prisms, base out, is very marked. I remember one instance in which the patient after weeks of faithful trial was unable to advance beyond a 6- or 7-centrad prism. So in cases of convergence paresis (see below) the prism convergence is extremely low or absolutely nil; and it also, of course, is abolished in complex cases in which a well-marked divergent squint has developed; but the latter are never pure cases of convergence insufficiency.

In most cases in which the prism convergence is low and difficult to acquire, it can still be brought to the normal by persistent training, and it is just in such cases, I believe, that training of this sort, when ultimately successful, is most beneficial.

4. *Exophoria for Near Vision.*—The exophoria for 25 cm. ranges from 6 to 30 centrads. Measurements made with the screen, parallax and phorometer usually agree and are pretty constant, provided the test-object is sharply defined (a fine dot is best for the purpose) and provided the patient is directed to fix and focus sharply on it. If these precautions are neglected, the amount of exophoria may vary widely even during the same examination. It often also varies from day to day, the amount depending on the patient's condition and the energy he is able to exert at the time. It will also be modified by the visual acuity and by the strength of the glasses used, and the effect of the latter should be particularly studied, in order to determine how far the deviation is accommodative in origin. In presbyopes a test should always be made with the reading-glass, and the strength of the latter should always be noted.

The exophoria regularly increases as the test-object is brought nearer the eyes. In convergence paresis this increase is particularly marked and uniform. In fact, in order to make the diagnosis of paresis, we have to make our near tests both beyond and within the usual 25-cm. distance, for instance, also at 1 meter, 50 cm. and 10 cm. (see below, in the discussion of convergence paresis).

However great the exophoria for near vision, in pure cases of convergence insufficiency it is habitually overcome at the ordinary reading-distance, provided both eyes can see the object of fixation. The patient, that is, has ordinarily at near points an exophoria and not a squint, although he may, and often does have momentary failure of binocular fixation with consequent double vision and confusion. It is only when the insufficiency is complicated with other factors (consecutive divergence excess, secondary weakening of the interni) that a constant squint for near points develops.[1]

5. *Convergence Near-Point.*—The convergence near-point (Pc) is abnormally remote. The normal position of the convergence near-point, as determined by a number of measurements, is in adults from 5 to 9 cm.,[2] and in children 4.5 to 8 cm.[3] from the base-line connecting the centers of the two eyes. It can be quite precisely measured as follows: The patient's glasses, or in lieu of these a trial-frame or spectacle-

1. Even when complicated with a marked divergence excess, so that the deviation is as high as 50 centrads, the patient may at times get binocular single vision. But in such cases the original condition is always probably a divergence excess, the convergence insufficiency being secondary and of recent development.
2. Indicating an actual convergence of from 38 to 62 degrees.
3. Indicating an actual convergence of from 45 to 65 degrees.

frame, is placed on the patient's nose and is used as a reference plane which is adjusted so as to be just 11.5 mm.[4] in front of the corneal apex when the eyes are directed straight ahead. The apex of a millimeter rule is placed against the point at which the reference plane crosses the nose, and the rule itself is held perpendicular to the plane, so as to lie strictly in the midline. Along this rule the test-object, which consists of a pin with a white head 2 mm. in diameter, or a minute dot on a card, is carried straight toward the patient's nose, the patient all the time being exhorted to converge on it as sharply as he can. The moment the object doubles insuperably, or the moment one of the patient's eyes is seen to diverge, the distance of the object from the reference plane is measured. If to this distance 2.5 cm. be added, the result will be very nearly the true distance of the convergence near-point from the intercentral base-line. If the latter distance (PcB) is beyond 8 cm. it denotes some weakness of convergence, and if beyond 10 cm. a well-marked insufficiency. Or we may say that the patient has a convergence insufficiency if his *convergence index*[5] falls below 30.

It is understood that in making this test the patient should try as hard as he can to converge on the test-object and to fuse the images as soon as the object tends to double.

In simple convergence insufficiency the convergence near-point is *absolute*, that is, the patient brings the eyes together so that both are directed at the test-object. When there is exotropia, only one eye is directed at the object and converges on it as it is approximated. In that case the other eye may make no attempt to converge at all, so that as fast as its fellow eye comes in, it goes out. Or, it also may make at least an attempt to converge and, although never actually directed at the test-object, may follow it in its movement toward the eye down to a certain point (*relative* convergence near-point) and then suddenly give up the effort and diverge.

The closer the relative near-point of convergence is, the greater we judge the patient's converging power to be, and the more we can rely on it in supplementing the effect of exercise or of operation.

When the patient has a considerable vertical deviation, his converging power may appear to be poor, when really it is quite good, for when the test-object is brought toward the eyes, he sees two images which he cannot bring together because they are on different levels. As he cannot unite them he makes no attempt to converge. In that case the dot used as a test-object should be replaced by a vertical line. The patient will converge on this, because when he does so the two images will unite, even if on different levels, since the bottom of one will join with the top of the other. On such an object a patient will be able to converge sharply, even when for the dot he apparently had very little converging power.

4. The distance is 10.5 mm. if the eye is quite myopic, 12.5 mm. if the eye is highly hyperopic.

5. The convergence index (Ci) $= \frac{100 \times \text{½ interpupillary distance}}{\text{PcB}}$

Ci ordinarily ranges from 35 to 50, although it sometimes equals 55 and may even (especially in children) run up to 60 or 63. When Ci is between 15 and 59, that is, for all values commonly encountered in both normal and abnormal cases, the relation holds that C=Ci + 3°, where C is the corresponding convergence of the eyes in degrees. For higher values of Ci the following relations obtain:

Ci	C	Ci	C
60-63	Ci + 2°	75-77	Ci − 2°
64-67	Ci + 1°	78-80	Ci − 3°
68-71	Ci	81-83	Ci − 4°
72-74	Ci − 1°	84-85	Ci − 5°

6. *Lateral Movements of the Eyes.*—In a pure convergence insufficiency, the inward and outward rotations of each eye, when moving parallel with its fellow, are normal in extent and comitant. This is found both in monocular and in binocular testing. An eye, for example, which, in attempting to converge with its fellow, halts when its corneal margin is 2 or 3 mm. from the caruncle, will, when tested with the perimeter or tropometer, rotate 45 or 50 degrees inward, and then, following the other eye as the latter moves outward, will turn in fully to the caruncle. Moreover, the movements are comitant, one eye moving as fast as the other without wavering or lagging on the one hand, or overshooting, on the other.

7. *Diplopia.*—Diplopia if present does not increase as the eyes are turned to the right or left. Owing to the natural tendency of the eyes to diverge when raised and to converge when lowered, the crossed diplopia caused by a convergence insufficiency tends to increase in looking up and to diminish in looking down. In slight cases of convergence insufficiency it may be present only in the upper field. Owing to the fact that the diplopia is caused by the inability of the eyes to converge properly, it naturally increases as more and more call is made on the converging power, that is, as the test-object is brought nearer the eyes. In a convergence paresis, this increase is particularly striking and takes place with almost mathematical regularity from distance to near, beginning to be observable at 20 feet or more from the eyes.

8. *Pupillary Signs.*—In cases of marked convergence insufficiency with remote convergence near-point, and particularly in cases of convergence paresis, the convergence reaction of the pupil is diminished or absent. In ordinary cases if we bring an object toward the eyes and urge the patient to fix sharply on it, the pupils contract as the eyes converge. The moment he gives up the effort of convergence and the one eye flies out, the pupils dilate. The more remote the convergence near-point, the sooner this will occur and the less marked will be the initial contraction of the pupil. In great weakness or in actual paresis of convergence there may be no initial contraction of the pupils at all. In this case if the reaction to light is present we have the inverse of the Argyll Robertson pupil.

DIFFERENTIATION FROM OTHER FORMS OF EXOPHORIA

The two chief conditions from which a convergence insufficiency is to be differentiated are divergence excess and insufficiency of an adductor.

DIFFERENTIATION OF CONVERGENCE INSUFFICIENCY AND DIVERGENCE EXCESS

CONVERGENCE INSUFFICIENCY	DIVERGENCE EXCESS
Exophoria for distance slight (only one or two centrads).	Exophoria for distance marked (from 5 to 30 or more centrads).
Exophoria for near marked (8 to 30 centrads).	Exophoria for near moderate (much less than for distance) may be almost nil.
Prism divergence not excessive (4 to 8 centrads).	Prism divergence excessive (10 to 30 centrads).
Prism convergence deficient and difficult to increase by exercise.	Prism convergence normal or readily brought to normal after two or three attempts.
Convergence near-point remote (over 9 cm. from intercentral base line).	Convergence near-point normal.
Crossed diplopia, if present, marked for near points and increasing as object is brought toward eyes.	Crossed diplopia if present, marked for distance. Usually none for near.
In both, rotations of eyes inward and outward in performing parallel movements normal and comitant; crossed diplopia, if present, not increasing to right or left, but increasing somewhat in looking up and decreasing somewhat in looking down.	

Divergence Excess.—A considerable number of cases of exophoria, probably a third, in fact, of all the cases that we see, are due primarily to what I call divergence excess. This condition is differentiated from a convergence insufficiency by the accompanying signs given in parallel columns.

Insufficiency of an Adductor.—From insufficiency of an adductor (internal rectus, superior and inferior recti), convergence insufficiency is differentiated by the fact that in the former condition either the power of movement of the affected eye inward is obviously impaired, or at all events the exophoria and the crossed diplopia, if present, increase definitely as the eyes are carried to one side or the other.[6]

MIXED AND SPECIAL FORMS

In many cases a convergence insufficiency is combined with other conditions, and sometimes the picture is so complicated as to render the diagnosis difficult. The most common combinations are:

1. *Convergence Insufficiency with Divergence Excess.*—This combination is very frequent. In fact, in the regular development of an ordinary divergent squint, what generally takes place is that either a primary convergence insufficiency has superadded to it a secondary divergence excess, or vice versa. In the former case, we see first an exophoria for near with normal relations for distance, later a squint for near combined with an exophoria for distances, and finally a squint for both distance and near with total absence of converging power. When the divergence excess is the primary condition, we have first an exophoria for distance with normal relations for near. This condition may last indefinitely or at least for many years without change. Then there develops an exophoria for near also, and a squint for distance, and ultimately a squint at all ranges, with, however, often at least partial retention of converging power. The last-mentioned is shown by the presence of a relative near-point of convergence. Whichever condition is the primary one, the final picture presented by the combined conditions is then a squint marked for both distance and near, and great, though by no means always total, loss of converging power.

2. *Convergence Insufficiency with Secondary Weakness of Interni.*—Secondary weakness of the interni often develops in cases of divergent squint of long standing; that is, as a result of a continued insufficiency of convergence combined with a divergence excess. In this case the power of rotation inward in making parallel movements of the eyes to right and left is obviously diminished.

3. *Convergence Insufficiency with Insufficiency of the Elevators or Depressors.*—This condition, which is manifested by a vertical deviation, increasing characteristically in some special quarter of the field of fixation, is not infrequent. In some cases of the sort the convergence insufficiency is more apparent than real (see below in the consideration of etiology).

4. *Convergence Insufficiency with Divergence Insufficiency.*—This rare and troublesome condition is marked by an exophoria for distance with very low prism divergence or actual homonymous diplopia for distance, and by marked exophoria for near with remote near-point of convergence. In some extreme cases there is an actual paresis of both divergence and convergence (see below in the section on convergence paresis).

6. Increase from the midpoint to both sides if both interni are weak.

5. *Anomalous Cases.*—Cases of rather peculiar physiognomy are those in which (*a*) there is a marked exophoria for near (10 or 12 centrads) with normal relations for distance and with normal convergence near-point, and (*b*) those with very slight exophoria for near but with remote convergence near-point. The former are perhaps to be explained as due to a slight weakness of the interni *per se*, and the latter as an ordinary convergence insufficiency, in which the patient by special effort at times overcomes the deviation.

ETIOLOGY

Convergence insufficiency is either primary or secondary.

A. Primary Convergence Insufficiency.—This may be either accommodative or non-accommodative.

1. *Accommodative* convergence insufficiency is the form in which the patient converges insufficiently because he accommodates insufficiently. This form is observed, first, in uncorrected myopes who, as they do not have to accommodate in looking at near-points, so do not converge either; second, in corrected presbyopes and hyperopes who, when they put on convex glasses, find themselves enabled to read without exerting their usual quantum of accommodation and, as they let their accommodation relax, relax their convergence also.

In all these cases of accommodative convergence insufficiency it is evident that the patient really has full power of accommodation, but, owing to refractive conditions of one kind or another, he exerts only part of it. As he puts only a portion of his available force into his accommodative work, he also puts only a portion into the work of converging and hence converges imperfectly. But there is another class of cases, rather frequent, in which the accommodation is really subnormal, and the patient works it to its limit, putting into it all the nerve-power at his command. How he will converge in this case will depend on the cause of the weak accommodation. There are two possibilities. Either the patient's neuromuscular accommodative apparatus is defective and his nerve-power is normal, in which case he makes a tremendous effort and nevertheless accomplishes very little, or his accommodative apparatus is normal but the nerve-power supplied to it is inhibited in some way, in which case he makes but little effort and therefore accomplishes but little. In the former case there is overstimulation, in the latter case understimulation of the accommodative apparatus and hence also of the converging apparatus. If the converging apparatus is normal, the patient should in the first case have a convergence excess, and in the second case a convergence insufficiency as the result of a genuine accommodative weakness. Examples of these two kinds of association do, in fact, occur, but are not very common, so that accommodative convergence insufficiency is apparently not often due to accommodative weakness of central origin. It more frequently happens that the two conditions, instead of being dependent one on the other, occur simultaneously, both being due independently to the same cause. In this case, of course, the convergence insufficiency is non-accommodative in origin.

Akin to accommodative convergence insufficiency is what we may call the *visual* form in which, owing to indistinctness of vision in one or both eyes or to incorrigible vertical diplopia, the patient has little impulse to converge. This is found in uncorrected presbyopia and in hyperopia of high degree; in anisometropia

V. 19

(very common); in poor vision due to opacities in media and also in absolute blindness of one eye, and in hyperphoria or other muscular anomalies which render fusion difficult. In cases of this sort the convergence insufficiency is usually spurious, at least at the outset. The patient, that is, can converge perfectly, but has no inducement to do so because the diplopia produced by the failure to converge is no more confusing than is the patient's vision when he converges well and superposes the two visual images. In other words—and this holds for most of the cases of the accommodative form too—the condition at the beginning is rather a convergence disuse than a convergence insufficiency. Later, however, continued disuse develops an actual insufficiency.

2. The *non-accommodative* form comprises about 60 per cent. of all cases of primary convergence insufficiency. It includes all those cases in which the refraction and accommodation cannot in any way be held accountable for the genesis of the motor anomaly. This is the case in patients who have low degrees of hypermetropia and astigmatism with equal refraction and with good vision in both eyes; also in patients who, though myopic, have been wearing their myopic correction for a long time, so that they are using their accommodation quite like emmetropes. In all these cases it is noted that continuous wearing of the proper refractive correction does not affect the muscular deviation except possibly to increase it. In a true accommodative convergence insufficiency, on the other hand, the deviation is diminished or even abolished altogether by the continuous use of the right glasses.

Non-accommodative convergence insufficiency is due to (*a*) conditions causing general nervous or systemic depression (neurasthenia, hysteria, anemia, convalescence from exhausting illness, and the like); (*b*) nasal obstruction (quite common), and (*c*) some unknown cause acting in persons whose muscular power and coordination otherwise seem normal. The more serious and inveterate cases, and particularly those that approximate to a convergence paresis in character, are perhaps due to a localized lesion, congenital or acquired, of the central nervous system (see below, section on convergence paresis).

As already noted, a convergence insufficiency, even when non-accommodative, may be associated with a weakness of accommodation which, like the insufficiency itself, is of central origin, the two being due independently to the same cause.

3. *Combined Accommodative and Non-Accommodative Forms.*—These mixed forms are not uncommon. Thus a convergence insufficiency, itself non-accommodative, may be increased and its symptoms may be intensified by the introduction of an accommodative element. This happens, for example, when we give a hyperope or a presbyope who already has a convergence insufficiency, too strong a glass for reading.

B. Secondary Convergence Insufficiency.—When a divergence excess has lasted a long time, a secondary convergence insufficiency often develops, producing the combined form of deviation, the characters of which have been noted. (See remarks on "Course," below.)

CONVERGENCE PARESIS

No absolute line of demarcation distinguishes a convergence insufficiency from a convergence paresis. In fact, the extreme form of convergence insufficiency that we see in a well-marked periodic divergent squint is really a convergence paresis more or less obscured by complicating conditions. The term "convergence paresis," however, is usually applied to a condition often sudden in development and evidently due to localized lesion or functional disturbance of the nerve centers, marked by the following features:

1. In far distance (points beyond 20 or sometimes beyond 50 feet), little or no deviation.

2. The moment an attempt at convergence is made, that is, as soon as the patient tries to follow an object brought from the 20-foot distance toward the eyes, exophoria and crossed diplopia set in and increase *pari passu* as the object is approximated. The increase takes place with almost mathematical regularity.

3. The diplopia once evident is almost or quite insuperable. Thus, when even it is so small that it requires only a 2- or 3-centrad prism to correct it, the patient is usually quite unable to correct it by voluntary effort. So, too, at a distance at which he normally sees single, he is quite unable to overcome even a 2- or 3-centrad prism, base out.

4. No attempt is made at convergence. When an object is carried toward the eyes, one turns toward it and the other turns off, *pari passu*. In a pure convergence insufficiency, however great, there is usually at least an attempt at convergence.

5. Just as in ordinary convergence insufficiency, so also in convergence paresis the lateral movements of the eyes are unaffected, each eye as it moves with its fellow to right or left rotating quite normally inward. So also the crossed diplopia, taken at any given distance, does not increase as the eyes are carried to the right or left. In other words, we are not dealing here with any paresis of the interni *per se*.

6. The convergence reaction of the pupil is usually absent.

Convergence paresis is rather rare. Still rarer is its combination with a paresis of divergence. In this condition, there is a single vision only at one definite point. Beyond this there is homonymous diplopia, within this crossed diplopia. Looking at an object situated at the point itself, the patient cannot overcome a prism, however weak, either base out or base in. It seems, in fact, as if his eyes were fixed immovably on a single point. But when it comes to making lateral or up and down movements, each eye moves as freely as usual and always in harmony with the other.

Convergence paresis may also be associated with paralysis of up-and-down movements of the eyes. It is at times, too, accompanied by paresis of accommodation, the lesions in this case being strictly coordinate; that is, they occur simultaneously as the result of the same cause and are in no sense dependent the one on the other. The picture then presented is very striking.

Convergence paresis is doubtless due to some lesion of the central nervous system. It occurs in multiple sclerosis (in 3 per cent. of the cases according to Uhthoff) and occasionally in tabes, and in isolated cases it is the result of traumatism, hysteria, tumor, hemorrhage and developmental disorders arising from affections of the ductless glands. It is also found as a congenital anomaly in most cases of the peculiar syndrome marked by paralysis of the external rectus, restriction of power of the internal rectus and retraction movements of the eyes.

In a case of mine which was associated with a marked paresis of accommodation, the voluntary dissociation of the eyes produced by prolonged work with the microscope seemed to be the starting-point of the trouble. In some cases the etiology is quite obscure.

COURSE

An accommodative convergence insufficiency of the ordinary type is, as I have noted, at the outset simply a convergence disuse. That is, the converging power is normally strong but is not used to its full extent. After a time, owing to this continued disuse, the converging power becomes actually subnormal. When this process is once initiated, there is a tendency, although by no means an invariable tendency, toward increase.

If it increase to a considerable point and is long maintained, it is then regularly followed by a divergence excess. Similarly, a divergence excess which has lasted a long time is likely to be followed by a convergence insufficiency. Thus result the combined forms (see above "Mixed and Special Forms"), which constitute the ordinary form of a fully developed divergent squint. A divergent squint, in other words, usually develops in one of the two following ways:

1. An accommodative or at all events a visual convergence insufficiency develops out of a convergence disuse. This at first is a heterophoria, which is marked for near points only. Gradually this increases by the superadding of a divergence excess, and now there is a heterophoria for a distance with a divergent squint for near (direct periodic squint). The deviation at both distances increases until ultimately there is a squint both for distance and near (continuous squint), but more marked for near.

2. A divergence excess, which produces a heterophoria marked for distance and but slight for near, which may last unchanged for years, ultimately increases by the superadding of a convergence insufficiency. There is now a divergent squint for distance and a heterophoria for near (inverse periodic squint). These increase until ultimately there is a squint for both distance and near (continuous squint), more marked, however, for distance than for near.

In both cases, a further change that takes place after a while is a weakening of the interni (hitherto normal) and a contracture or hypertrophy of the externi. The inward rotations are then no longer normal and the deviation becomes greater still.

The course of a non-accommodative convergence insufficiency—and the same is true of a convergence paresis—depends on its causation. If due to a temporary condition, the insufficiency or the paresis will clear up; otherwise it may remain unchanged for years or in some cases gradually increase. A non-accommodative convergence insufficiency may thus also give rise to a divergent squint.

SYMPTOMS

The symptoms of convergence insufficiency are diplopia (with accompanying confusion and vertigo), asthenopia, eyeache, headache, and sometimes more remote reflex symptoms.

Diplopia, although it can almost always be elicited, is rarely a subject of spontaneous complaint except in convergence paresis, when it is often very distressing. Confusion (especially in reading) and vertigo may occur, but are not common except in extreme cases of insufficiency or cases of actual convergence paresis.

Asthenopia is a common symptom, and often is associated with burning and irritation of the eyes (asthenopia irritans) or with eyeache (asthenopia dolens). The asthenopia is sometimes extreme and incapacitating. It is often aggravated by the use of convex glasses, because with them the patient not only tends to relax his accommodation and hence increases his convergence insufficiency, but also brings objects close and so puts more strain on his convergence. Sometimes, in fact, the asthenopia is so great that the patient cannot wear the proper glasses at all.

Headache is not a very common symptom, nor are reflex symptoms very often encountered—not so often, indeed, as in other muscular anomalies. Of course when squint has developed, the deformity due to it constitutes for the patient a symptom of considerable moment, and in convergence paresis and in convergence insufficiency due to general conditions we have to reckon with the symptoms arising from the causal lesion. So, too, we have to reckon with the asthenopic symptoms due to the associated insufficiency of accommodation when this is present. These may be difficult to distinguish from the symptoms of convergence insufficiency itself.

In a large proportion of cases of convergence insufficiency there are no symptoms whatever that can be referred to the motor anomaly itself, that is, that are not relieved simply by treatment of the attendant conditions (refractive errors, etc.).

TREATMENT

The measures available for treating a case of convergence insufficiency are:

1. Correction of the refraction.
2. Correction of exciting causes other than refractive errors.
3. Practice in converging on an approximating point and with prisms, base out.
4. Practice with the amblyoscope, stereoscope and bar-reading.
5. Practice in the recognition of diplopia with the aid of the red glass, etc.
6. Prisms for constant wear.
7. Operation.

1. In a case of convergence insufficiency the first demand of treatment is to correct the *refraction* with scrupulous care. By so doing we remove any accommodative or visual element which may aid to produce the insufficiency, and thus in a moderate proportion of cases relieve or at least diminish the tendency to deviation. In a much larger proportion of cases, the correction of the refraction, while not producing much effect on the deviation itself, does relieve the symptoms.

A convergence insufficiency associated with hyperopia is sometimes aggravated by the full correction of the refractive error. In such cases we may have to undercorrect the hyperopia by an amount which will vary with the conditions and symptoms present in the given case, but which in general will have to be determined experimentally.

In presbyopia associated with convergence insufficiency it is particularly important not to add too strong a glass for reading, since with such a glass the patient will have to bring objects too close and thus impose too great a strain on the already subnormal convergence. Neglect of this precaution is a frequent cause of trouble in giving glasses to presbyopes, especially in the early stages of presbyopia.

As in other muscular conditions, so also especially in convergence insufficiency, correction of the refraction should be the first means used, and until its efficacy has been tested by long and persistent trial, other

treatment should not generally be employed. Otherwise we shall fail to differentiate between the symptoms due to the refractive error and those due to the muscular trouble. By eliminating one set of symptoms at a time, and the one, moreover, that is usually of most significance to the patient, we shall be surer of our diagnosis and more likely to give ultimate relief. It need scarcely be added that the earlier in a case the refractive treatment can be applied the better the result we may expect.

2. In non-accomodative convergence insufficiency and particularly in convergence paresis, the exciting cause (neurasthenia, hysteria, nasal disease, organic disease of the nervous system) must be sought out and treated. In cases the etiology of which is not evident, tonics, open-air exercise and the restriction of near work for a season are often indicated.

3. Exercising the convergence by simply making the patient fix sharply with both eyes a dot brought steadily up toward the eyes or by practice with prisms, base out, is of service both in accommodative and in non-accommodative convergence insufficiency. I have elsewhere[7] laid down precise rules for what I believe to be the best method of making the practice. In general I think it important that in simple convergence insufficiency, exercise with converging prisms should be employed with the test-object at the reading distance only, while if there is an associated divergence excess the exercise should be done with the object both at 20 feet and at near. These exercises seem to me to succeed particularly well when there is an associated weakness of accommodation; the latter is also thereby stimulated.

4. The use of prisms for exercising the convergence presupposes ability to recognize diplopia and to fuse double images. If the patient is deficient in either regard, we shall secure better results with the amblyoscope. The way to use this is, first, to get the patient habituated to seeing with the two eyes together, that is, to set the instrument in such a way that he clearly makes out two distinct images. The second step is to habituate the patient to seeing with both eyes when the images are brought close together, and finally to adjust the tubes so that the two images are superimposed and actually fused. The third step is to make the patient practice convergence after the images are thus fused, that is, to urge him to swing the tubes toward each other while still maintaining fusion. The successful carrying out of these different stages of the practice may take weeks or months.

For the proper carrying out of this practice, the amblyoscope should have a suitably graduated arc, so as to measure the position of the tubes and register the amount gained by exercise, and also a vertical adjustment to correct the hyperphoria that is not infrequently present.

Fusion may also be exercised usefully with the stereoscope and with bar-reading.

5. Another way, besides the amblyoscope, of getting the patient to recognize the fact that he sees double and to pave the way to the use of converging prisms, is to separate the images widely by prisms, or to make the images dissimilar by using a red glass before one eye and a green glass before the other. Systematic exercises at home of this sort may usefully precede exercises with prisms, base out.

7. Duane, Alexander: Ophth. Rec., June, 1911.

6. The use of prisms, base in, to correct the deviation is in my belief a procedure to be condemned. Affording a temporary relief, it has seemed to me that in most cases such prisms ultimately increase the deviation and the symptoms, too. On the other hand, the correction of a coexistent hyperphoria by prisms, base up or down, may afford considerable relief to the symptoms and make the lateral deviation much more manageable by ordinary means.

7. Operation should not be done unless all other means have been thoroughly tried and have failed and unless also the symptoms are severe and likely to be permanent. In a simple convergence insufficiency, advancement or tucking of the internal recti is indicated. It may or may not be combined with tenotomy of the external rectus, but if we are dealing with a simple convergence insufficiency, the tenotomy should not involve the lateral attachments of the tendon and should be done to such an extent only as to relax the strain on the advanced muscle. If there is well-marked divergence excess, free tenotomy of the externus should be combined with the advancement of the internus.

It is best to operate on one eye and from four to six weeks later operate on the other if necessary.

If there is a considerable vertical deviation this should in general be relieved by operation before any attempt is made to operate for the lateral displacement. Otherwise the lateral displacement is liable to recur, and on the other hand, if the vertical deviation is corrected first, it may happen that the lateral deviation may not need correction at all.

139 East Thirty-Seventh Street.

ABSTRACT OF DISCUSSION

DR. WILLIAM N. SOUTER, Portsmouth, N. H.: I would not use the centrad in prism measurement. I have no criticism to make of the centrad in itself, but the prisms in our trial cases and those kept in stock by opticians are not made on the centrad scale; and since I know of no advantage which the centrad has over the prism diopter, I think it is better to use the latter, the generally adopted unit. It is true that the centrad and the prism diopter are so nearly equal in value that no error is ordinarily made by designating in centrads prisms which are manufactured on the diopter scale, but in the very strong prisms an amount of error is ignored, which, though not serious, is yet not in accord with Dr. Duane's usual accuracy. A prism of 50 prism diopters corresponds to 46 centrads. My second point of disagreement with Dr. Duane is as to the amount of convergence which is to be regarded as normal. He makes a diagnosis of convergence insufficiency if the person cannot converge to a point 9 cm. from the intercentral base line, or, on an average, about 2½ inches from the root of the nose. I do not think so great an amount of convergence is required for comfortable use of the eyes in ordinary near work. I should hesitate to ascribe to convergence insufficiency any symptoms which might occur in a person who could converge to a point 12 cm. from the intercentral line, 4 inches from the root of the nose. Thirdly, I do not believe that prism exercises or convergence exercises are a rational procedure. I say this, though I am aware that I am in this respect at variance with the majority of ophthalmologists. I believe that, aside from the psychic effect, nothing whatever is gained by this method. I have reached this conclusion partly from my own early experience, partly from the results which I have seen in patients who have undergone this kind of treatment under the direction of competent advocates of such exercises, and partly from my conviction that it is unreasonable to expect these exercises to accomplish what cannot be accomplished by the normal stimulus afforded by the ordinary use of the eyes in near work. Finally, I believe

that prisms, bases in, are of great value for permanent wear in cases of uncomplicated convergence insufficiency. In many of these cases there is some innate peculiarity which renders convergence difficult, and the slight assistance afforded by the prisms is sufficient for comfortable use of the eyes. I have patients who have been wearing such prisms for many years with permanent relief.

Dr. Francis Valk, New York: I wish to speak only with reference to when and how to operate in these cases of what I call exophoria or the convergence insufficiency of Dr. Duane. I fully agree with him concerning the treatment of these cases—the only ones, in my opinion, suitable for prism exercise—but when we have passed that stage we must consider an operation. Dr. Duane has placed this as the last procedure; but we see these cases after all other means have failed; then why not operate at once? If we have a low degree of exophoria they may be improved by other means, but if we have an exophoria of more than 3 degrees it seems to me that all these attempts to improve the motive power of the interni will be useless, and that operation must come. If that is correct, and all tests, both subjective and objective, show a high degree, then operate. I plead for early operation because I think the day of tenotomy has passed, and when we can do a simple and effective operation that always gives relief, never gives an overcorrection, and can be performed under cocain, that procedure which is now offered to the profession in more than ten different methods, should be the operation of choice. I refer to the well-known operation of shortening the tendon of the weak muscle. Furthermore, Dr. Duane says, "Operate on one eye and in three or four weeks operate on the other." Which eye, however, shall be operated on first? This is to me a very serious and important question, as I have seen many failures from tenotomy. If you operate on both you may get the right one, but is that correct? Is the fault equally present in each eye? Hence, if we can place our weak muscle in insufficiency or in excess, is it not essential to shorten the weak muscle before any attempts to do a tenotomy? I have followed this rule for many years and seldom do more than one operation, when I follow the readings of the tropometer; and, as Howe says, this instrument is the keynote and indicator of all operations on the muscles of the eye.

Dr. D. W. Wells, Boston: With regard to the treatment of insufficiency, under Head 4 as given by Dr. Duane, I should like to make a plea for the more constant use of the stereoscope. Dr. Duane has said that many cases could not be well trained by prisms, because the patients do not quickly recognize diplopia. It seems to me, therefore, the logical procedure would be to carry on some course of educative treatment which would teach the patient to recognize diplopia, and nothing is better for this than to train the fusion faculty. Simple testing with the stereoscopic charts will show that most of these patients tend to suppress one eye more quickly than the other as soon as the test-letters become small. Now the use of the stereoscope with charts which will increase the patient's fusion faculty is one of the best means of teaching him to overcome this insufficiency. The power of a muscle, it seems to me, depends not alone on its size, but also on the innervation which goes to the muscle, and this depends on the development of the fusion faculty, and varies in different individuals. Therefore my plea is for the development of the fusion faculty by means of the stereoscope and also by constant bar and control reading which Dr. Duane simply mentioned. This can be carried out quite systematically and the patient himself can see the value and advantage of properly using his fusion faculty.

Dr. Edward Jackson, Denver: One or two points have been raised that deserve emphasis. Of treatment, Dr. Duane puts first and emphasizes correction of errors of refraction. Errors of refraction are a more frequent cause of some symptoms of convergence insufficiency than is convergence insufficiency itself; but real convergence insufficiency is probably caused by efforts to overcome errors of refraction. We all understand how myopia, preventing the normal use of accommodation, may lead to convergence insufficiency; but other errors of refraction—astigmatism, and particularly anisometropia—may disturb the coordination of ocular movements; and, as Dr. Duane points out, this is the essential fault in convergence insufficiency. I use prism exercises very little. I see many cases in which, I think, they are used foolishly and uselessly. Yet as this trouble is a disturbance of coordination, we may sometimes bring about better coordination by breaking up the old habits; and I know of no more direct and effective means of doing this and improving the coordination of the ocular movements, than by exercising them with prisms as has been recommended. The centrad departs from the prism diopter, when the prism diopter departs from conforming to the requirements of a scientific unit. As long as ten prism diopters are ten times one, the two go together; but when the 50 prism diopters are only 46 times the one prism diopter, then the prism diopter departs from being a scientific unit and from the centrad. In practical use I never saw a trial case in which the prisms ran above 30 centrads; but when we get up to the higher degrees of deviation, 60, 80 or more centrads, then the prism diopter is a very inferior unit of deviation.

Dr. Mark D. Stevenson, Akron, Ohio: For a number of years I have been examining for insufficiency, in all cases; some of it is frequently found. The practical point is that we should be careful in determining the distance in selecting lenses for close work for such patients. Unless the vocation demands a special near point, we should give lenses with which the patient can see at a fairly good distance. Strong lenses, making him read at a very close distance, especially in people with great pupillary distance, give added work for the adductors. Often the last straw is what counts and if only a little assistance is given the patient is relieved. I found also in a serious of tests, made years ago, in examining in different positions in the field with a small point of light and Maddox rod, which of course is not perfectly exact, that the insufficiency was different in degree straight ahead or to one or the other side. I found I could relieve some of these patients by causing them to hold the reading-matter to one side. They could converge better to one side than to the other, just as we have trained ourselves in school to have the books to one side. Some of these patients are probably slightly paretic from various toxemias, the cure of which will give relief. In anisometropia it is often important that the patient hold the reading-matter in a particular place, to one side, or up or down or with the head held in a particular position. We should all realize the importance of muscle training; it does not matter that before muscle training we have for example 9 degrees of lack of balance and afterward the same. If we have stronger muscles to overcome the insufficiency the patient may be rewarded with relief from symptoms. The muscle exercises may need to be repeated, but if it gives a patient months of ease and relief, that is the purpose of our calling.

Dr. George H. Price, Nashville: The definition of the condition given by Dr. Duane in the second paragraph of his paper reduces it to one ordinarily known as asthenopia, and the question is as to the best method by which we can combat these symptoms of insufficiency. I was struck by the suggestion of Dr. Stevenson that when some of these patients held the book in a certain position they would be relieved in great measure of the discomfort of the insufficiency. This is a point of great significance. When we have insufficiency of the internal recti we are dealing with a muscle not sufficient in strength to overcome the opposing muscle, and this is because in every individual the musculature varies. The innervation of the internus is almost from the same source practically as that of the superior and inferior recti and the inferior oblique and the coordinate muscles of accommodation. Therefore that has a great deal to do with it. If you have bad accommodation then you have the complication of the deficiency of the internal recti, or of the involvement of the ciliary muscle. All these things must be considered in correcting the vision. The amount of accommodation is indicated by the patient. If all the muscles of the eye are low in their muscular strength, then it would be impossible to go ahead and strengthen one pair of muscles. It would not be desirable; but we would exercise all of them. The simplest

method of doing that is by the ceiling-to-floor and wall-to-wall method. If the patient has low accommodation and insufficiency of the internal recti, a little exophoria and considerable hypermetropia, I know he will have trouble.

DR. OSCAR WILKINSON, Washington, D. C.: Exophoria for near is a normal condition. I have for the past three years, in all presbyopic cases, examined for near and I would say that at least 90 per cent. will have exophoria for near of at least 3 to 5 degrees. So I do not think we should assert that exophoria of 4 or 5 degrees is abnormal. It does not really demand any attention. I would also like to concur with Dr. Duane with regard to the slight changes that the correction of the refractive error makes on these muscular defects. I thought at one time it probably had a great deal to do with that, but after studying a great many cases after the glasses had been worn I find there is practically no change in the muscular balance due to the correction. He also notes another thing which I have noticed, that right hyperphoria is much more frequent than left. In the cases which Dr. Duane called paresis I have found electricity to have a markedly beneficial effect, and I think we are neglecting a valuable therapeutic agent if we do not use it in recent cases. I also use tincture of nux vomica internally.

DR. ALEXANDER DUANE, New York: Dr. Souter thinks I have placed the convergence near point too close. I should have thought so too, had I not made a series of measurements which seem to show that the distances ordinarily assigned are too remote. A convergence near point beyond 9 or, at any rate, 10 cm. from the base line connecting the centers of the two eyes I consider too remote, and if constantly present indicates a convergence insufficiency. With regard to exercise with prisms, base out, in convergence insufficiency, I think a good deal depends on how they are used. If the exercise is made with the object at 20 feet we may not only do no good but may do harm. I am a little more chary of doing operations than Dr. Valk, and yet I recognize the good results from his tucking operations. He asks how we are to determine which eye to operate on first. I should select the eye which in the act of converging regularly diverges and which also shows, as it is apt to do in cases requiring operation, a demonstrable secondary weakness of the internal rectus. I agree with Dr. Wells as to the value of the stereoscope and bar reading, and I find his stereoscopic cards very valuable. Dr. Stevenson makes a point about convergence insufficiency in presbyopia. He will find on referring to my article that he and I are in substantial agreement—that is, if I understand him aright.

SUMMARY OF RESEARCH STUDIES IN PSORIASIS *

JAY F. SCHAMBERG, M.D.
Director of the Research; Professor of Skin Diseases, Philadelphia Polyclinic and College for Graduates in Medicine

A. I. RINGER, M.D.
Assistant Professor of Physiologic Chemistry, University of Pennsylvania, Department of Medicine

G. W. RAIZISS, PH.D.
Associate Professor of Physiologic Chemistry, Philadelphia Polyclinic and College for Graduates in Medicine

JOHN A. KOLMER, M.D.
Professor of Pathology in the Philadelphia Polyclinic and College for Graduates in Medicine

PHILADELPHIA

During the past two years we have had, through the generosity of a benefactor, the opportunity of prosecuting an inquiry into the cause and nature of psoriasis with the purpose of better enabling us to treat this prevalent and obstinate disease of the skin. This work has been carried out in specially equipped laboratories and with all possible thoroughness. Psoriasis is a disease that has been known since the days of the early Greeks, who characterized it by the name of "lepra." Despite the fact that it constitutes from 4 to 5 per cent. of all skin-diseases, the nature of the disease has remained thus far an enigma. Many theories have been advanced to explain its pathogenicity, but none has been satisfactorily demonstrated to be true. The three most prevailing views with regard to psoriasis are that (1) psoriasis is due to a parasite, (2) psoriasis is a disease resulting from disturbed metabolism, and (3) psoriasis is a disease of neuropathic origin. The last view referred to, while advocated by some men of prominence, has relatively little to commend it.

We have concentrated our activities in investigating psoriasis along two particular lines of inquiry — bacteriologic and metabolic. We have labored assiduously during the period of our investigation to find some micro-organism in the scales, serum, skin and blood of patients suffering from psoriasis, but we have thus far been unable to discover any micro-organism which could be regarded as bearing an etiologic relationship to the disease. Twenty-two different microbes have been isolated by us from psoriasis scales and have been individually studied with a view of determining their special characteristics. Complement-fixation tests have been carried out with groups of these organisms with entirely negative results. We have likewise made up vaccines with the isolated bacteria, but have failed to produce any effect on psoriasis by their use. The ultramicroscope and all sorts of special culture mediums have been employed without materially aiding us in elucidating the cause of psoriasis. We have not abandoned the bacteriologic study of psoriasis, but up to the present time it may be said that no germ has been found which could be regarded as bearing a causative relation to the disease.

METABOLIC INVESTIGATIONS

During the past two years we have investigated the metabolism of about a dozen patients suffering from psoriasis. Obviously, that which first commanded our attention was the protein metabolism. We have carried out investigations of the nitrogen balance in patients for long periods of time under the most rigid conditions. The food received by patients was analyzed and weighed, and the nitrogen in the urine and feces was carefully determined. The scales were collected with as much care as possible and their nitrogen content likewise determined. In one instance the perspiration was collected for certain periods of time and subjected to analysis. The patients were housed in private rooms and were under the care of a special trained nurse. Our patients were studied for periods varying between forty and 168 days.

In all our studies of the protein metabolism, attention was paid to possible qualitative disturbances as well as quantitative. The distribution of the urinary nitrogen was therefore studied in most of the cases. Our patients were kept on diets containing definite quantities of nitrogen and a definite caloric value. The total nitrogen intake was compared with the total nitrogen output and balances established.

Our work was not very far advanced when we began to realize that we were dealing with a disease the subjects of which suffered from a peculiar disturbance in protein metabolism. We learned very soon that these patients possessed the power of retaining rather large quantities of nitrogen on diets on which

* Read before the Section on Dermatology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

normal persons would just maintain equilibrium. The giving of a diet containing large quantities of nitrogen (about 20 gm. a day) was followed by an enormous retention of nitrogen. And what is perhaps more important, on a very low-nitrogen diet, that is, a diet containing about 4 gm. of nitrogen a day, on which a normal person can hardly maintain equilibrium or at best do so with great difficulty, the psoriatic patient has the power of so altering his protein catabolism as to maintain equilibrium with perfect ease. The psoriatic patient possesses the power of reducing the urinary nitrogen output to a level lower than has ever been recorded in the studies of protein metabolism.

Clinically, we noted a very definite relationship between the protein metabolism and the course of the eruption. In the active stages of the disease, a high-protein diet brings about a spread of the eruption; conversely, a low-protein diet is followed by improvement even when no local remedies are applied.

Two questions presented themselves as soon as these facts were recognized:

1. What is the nature of the relationship between the protein metabolism and the psoriatic processes of the skin?

2. What is the cause of the nitrogen retention observed in psoriatic patients?

We believe that answers to these questions may be found in the consideration of the following:

One of the most prominent features of the psoriatic lesion is the rapid proliferation of the epithelial cells. These cells become cornified and are thrown off as scales. Repeated analysis has demonstrated that these scales are composed almost entirely of pure protein; in severe forms of psoriasis very large quantities of scales may be exfoliated, entailing the loss of considerable amounts of protein material. The epithelial cells for their life and growth require large quantities of building material in the form of protein, which can come from only one source, the blood and lymph.

It is a well-established fact that the growth and multiplication of cells depends directly on their "growth impulse" or *Wachstumstrieb*, and that the velocity of their growth can be regulated entirely by the amount and character of "building material" placed at the disposal of these cells.

It becomes evident, therefore, that any diet which will tend to increase the concentration of amino-acids in the blood and lymph will tend to accelerate the growth and multiplication of these rapidly growing cells. A high-protein diet strongly favors the spread of the psoriatic lesions, because it causes an increase in the concentration in the blood of the various building materials, and places at the disposal of the psoriatic cells a plentiful supply of nutrient material.

A low diet, on the other hand, appears to influence the psoriatic lesion in just the opposite way. The concentration of amino-acids does not rise above the normal, and what is perhaps more important, the protein catabolism is reduced to the lowest level possible.

No harm whatsoever is caused by keeping a patient on a very low-protein diet for a long period of time, provided the caloric supply is sufficient to maintain the patient's body-weight. Chittenden for a number of years has advocated the advisability of keeping man on a 6-gm. level of nitrogen, and Hindehede has shown that nitrogen equilibrium and mental and physical efficiency can be maintained for long periods of time on diets containing even less nitrogen.

In the accompanying table are given different type diets which we have employed in the treatment of our psoriatic patients. They contain from 4 to 5 gm. of nitrogen and sufficient calories to cover the needs of a man doing a moderate amount of work. In hard-working persons additional butter and cream can be added. Our patients were allowed plenty of sugar, and in some cases candy was given between meals.

TYPE OF REGIMEN FOUND TO BE MOST BENEFICIAL IN PSORIASIS

Food	Amount, gm.	Nitrogen, Per Cent.	Nitrogen, gm.	Calories
Diet 1				
Breakfast—				
Bread	20	1.55	0.31	53
Butter	15	0.12	0.02	113
Grape-Nuts	10	1.96	0.20	40
Orange	180	0.128	0.23	83
Apple	133	0.064	0.09	77
Tea	125	0.015	0.02	...
Cream	30	0.336	0.10	57
Total	...	.....	0.97	423
Lunch—				
Bread	15	1.55	0.23	39
Butter	15	0.12	0.02	113
Grapes	150	0.208	0.31	129
Lima beans	50	1.21	0.60	37
Turnips	75	0.118	0.09	31
Corn-starch	189	0.065	0.12	297
Potato-cake	300	0.275	0.82	273
Tea	125	0.015	0.02	...
Total	...	.....	2.21	919
Supper—				
Bread	25	1.55	0.39	66
Butter	15	0.12	0.02	113
Prunes	88	0.08	0.07	63
Cauliflower	75	0.338	0.25	22
Corn	100	0.386	0.39	95
Celery	25	0.176	0.06	5
Potatoes	200	0.255	0.51	185
Total	...	.....	1.69	546
Total for day	...	.....	4.87	1,888
Diet 2				
Breakfast—				
Bread	20	1.81	0.36	53
Butter	15	0.12	0.02	113
Grapefruit	146	0.13	0.19	67
Banana	99	0.208	0.21	87
Puffed rice	10	1.17	0.12	36
Cream	30	0.397	0.12	57
Total	..	.....	1.02	413
Lunch—				
Bread	16	1.81	0.29	42
Butter	15	0.12	0.02	113
Corn-starch	153	0.138	0.21	236
Cabbage	75	0.198	0.15	22
Lima beans	75	0.789	0.59	55
Potato-cake	250	0.323	0.81	277
Total	..	.....	2.07	695
Supper—				
Bread	25	1.81	0.45	66
Butter	15	0.12	0.02	113
Lettuce	25	0.192	0.05	5
Beets	100	0.17	0.17	37
Corn-meal	125	0.246	0.31	188
Prunes	86	0.08	0.07	62
Sweet potatoes	100	0.216	0.22	195
Cream	20	0.397	0.08	38
Total	..	.....	1.37	704
Total for day	..	.....	4.46	1,812

These two diets give an idea of the way dietaries of this nature can be arranged, without losing sight of the necessity of a certain amount of variety in the menu. Oysters and ice-cream may be added to the diet, as they contain very little nitrogen. During the spring and summer when berries and fresh vegetables are plentiful, these diets can be made more varied.

For patients who are up and about attending to their business, it would be advisable to have them submit their twenty-four-hour specimen of urine about once a week for analysis. The urine, if the patient adhered rigidly to the dietary prescription, should not contain more than from 3.5 to 4 gm. of nitrogen. If it contains more it is safe to assume that the patient is not

living on the prescribed diet. Early recognition of this fact will be of service to both the patient and the physician.

There are many dermatologists who state that they have tried dietary restriction in psoriasis, but have failed to observe the beneficial results claimed for this method of treatment. It should here be stated that the more severe and wide-spread the eruption the more readily will it be influenced by appropriate diet, and on the contrary, the more limited the eruption the more difficult will it be to influence it by diet alone. We have tested the influence of diet under most critical conditions and we feel fully justified in stating that the eruption of psoriasis may be favorably or unfavorably influenced by variations in dietary regimen. We have not failed in a single instance to bring about marked improvement in our research patients by diet alone. We are free to admit that outside of the hospital our results have been much inferior to those obtained with hospital patients, for the latter are supplied with the exact kind of food in measured quantities.

It is necessary, to secure the best results, that the diet should not contain more than 5 gm. of nitrogen a day. Very few private patients who are not given detailed instructions as to the quantity of the various foodstuffs to be taken will reach so low a level. Such a low-protein dietary may be difficult for those with epicurean tastes to content themselves on; our patients, however, lived on a regimen of this character for many weeks without complaint.

We have no doubt that many patients with severe and obstinate psoriasis eruptions would be willing to adhere to such a diet to secure a disappearance of their eruption. How long it is necessary or desirable for a psoriatic patient to continue this rigid diet we are not quite prepared to say. We have found that several weeks of this regimen will usually alter the reactivity of the skin to external medicaments, so that an eruption which is too inflammatory to permit of the use of chrysarobin or other strong applications in the beginning, afterward will yield readily to such local treatment.

One of our patients who had a universal psoriasis has remained practically free for a year by adherence to a diet similar to that on which she subsisted in the hospital. The more nearly the diet approximates the type of diets referred to above, the more quiescent will the psoriatic process remain.

It may, however, be undesirable by reason of the condition of the patient's nutrition and general health to continue on such a diet too long. We have reason to believe that a low-nitrogen intake may favorably influence other wide-spread dermatoses. We have cured a rebellious case of exfoliative dermatitis of two years' duration and have seen striking improvement in a case of chronic generalized eczema and in a case of dermatitis herpetiformis while under this treatment, the two latter patients using no local treatment to speak of.

In psoriasis, dermatitis exfoliativa and allied conditions in which there is a great multiplication and a casting off of the epithelial cells, the low-protein diet seems to quiet down the condition by a process of epithelial cell starvation. Sweet, Corson-White and Saxon have shown that inoculation-tumors of mice and rats may be similarly influenced by a very low-protein diet.

THE GERMICIDAL PROPERTIES OF CHRYSAROBIN AND CERTAIN OTHER REMEDIES

In 1877 an Englishman, Keith, first employed chrysarobin in the treatment of psoriasis. The drug had been previously used by Balmanno Squire of London, in the treatment of ringworm of the scalp. Chrysarobin is a remarkable substance which exerts a powerfully beneficial and rapid influence on the patches of psoriasis. No other drug can be compared with chrysarobin in its rapidity of effect. In many cases it acts almost as a local specific. The drug is derived from the woody fiber of the *Andira araroba* tree, the crude product being known as Goa powder. From almost time immemorial the natives of Brazil have employed this powder in the treatment of skin-diseases.

It was thought profitable to investigate the germicidal activity of chrysarobin and certain other medicaments employed in psoriasis with a view of shedding collateral light on the nature of the disease. It is obvious that if chrysarobin proved to be powerfully

Fig. 1.—Extensive psoriasis eruption.

germicidal, this fact would aid in interpreting its effect on psoriasis patches. If, on the other hand, chrysarobin possessed only feeble or no germicidal power, such facts would likewise be helpful in offering a solution of its mode of action. In our investigations difficulty was experienced at the outset in determining the germicidal power of chrysarobin because this drug is insoluble in water. The Rideal-Walker and the Hygienic Laboratory methods of determining the germicidal power of drugs apply only to substances which are soluble. We were therefore obliged to devise a method of determining the germ-killing power of insoluble substances. By a stroke of good fortune, we selected calomel as a standard. We have already published[1] a note on the germicidal activity of calomel. We found that calomel, as well as other mercurials, possessed, *in vitro*, the most powerful germ-destroying influence of any known drugs. Weight for weight,

1. Schamberg, J. F., and Kolmer, J. A.: The Germicidal Activity of Calomel, THE JOURNAL A. M. A., June 20, 1914, p. 1950.

calomel was found to be just as germicidal as mercuric chlorid. This is all the more remarkable when one considers the insolubility of the former. Having determined that insoluble substances were capable of destroying bacterial life in solid mediums in the Petri dish, we were enabled to test out the activity of chrysarobin and certain allied substances. Chrysarobin in the highest amount used (120 mg. or 2 grains in 10 c.c. of bouillon) failed to restrain bacterial growth. We have furthermore incorporated chrysarobin in various culture-mediums in such excess that the powdered drug floated on the surface of the medium and yet staphylococci and the ringworm fungus were capable of producing a flourishing growth on such mediums. We have supplemented this study by various other investigations, all of which confirm the fact that chysarobin possesses but feeble or no germicidal action.

We do not feel as yet justified in drawing any definite deductions from these facts, but merely desire to state our findings. Chrysarobin, the most powerful and efficacious drug known in psoriasis, has practically no germicidal power. Calomel, on the other hand, which we have found to be highly germicidal and capable of destroying the cocci in the skin, has but a feeble effect on the patches of psoriasis.

Fig. 2.—Same patient ten weeks later, showing improvement in eruption as a result of low-protein diet. No internal treatment and no external applications whatsoever.

THE BIOCHEMICAL ACTION AND CHEMOTHERAPEUTIC STUDIES OF CHRYSAROBIN AND ALLIED SUBSTANCES

We have endeavored to determine the changes which take place in the skin when chrysarobin and certain allied products are applied. It is a well-known fact that chrysarobin produces a curious mahogany-colored discoloration of the skin which lasts until an exfoliation of the stained horny cells takes place. It would appear that the greater the degree of staining, the more beneficial is the effect of the drug on the disease. We have shown by a series of experiments, which will be detailed at full length elsewhere, that chrysarobin has a powerful affinity for certain elements of protein. Indeed, the staining of the scales by chrysarobin produces a firmer union than the staining of the scales by any known anilin dyes. The staining of the skin appears to be intimately associated with the process of oxidation. Chrysarobin is powerfully reducing, and in undergoing oxidation, abstracts oxygen from the protein of cells, for we have demonstrated that the oxidation can go in the absence of air in a hydrogen atmosphere. We believe from our experiments that the effect of chrysarobin is in large part due to two influences: (1) the firm union with the protein of the epithelial cells and (2) the abstraction of oxygen. It is quite possible that this may explain the favorable influence of the drug in psoriasis, for the action referred to may restrain the great proliferative activity of the epidermal cells which characterizes this disease.

Some investigators, chief among whom was Unna, maintained some years ago that chrysarobin produced its favorable influence in psoriasis by abstraction of oxygen, the drug being oxidized into chrysophanic acid, a reddish-brown substance. The investigations which we have carried out seem to support the view that the reducing power of chrysarobin is of great importance in influencing its therapeutic efficacy. As has been stated, this action and the remarkable chemical affinity of chrysarobin for protein, particularly for the keratins of the skin, appear to us to be in large part responsible for the beneficial influence of this drug. Psoriasis scales which are incubated with a watery suspension of chrysarobin at 37 C. (98.6 F.) are deeply stained by the drug. The chemical combination is so firm that it is impossible to remove its coloration even by prolonged boiling with glacial acetic acid. The chemical combination of chrysarobin with protein is apparently stronger than that of any known anilin dye.

Recent investigations into the chemical constitution of chrysarobin have revealed the fact that it consists of a number of chemically allied substances. Following the work of certain other chemists, we have isolated the two important ingredients of chrysarobin, chrysophanol-anthranol and emodinol. We have tried out these substances clinically and have found that emodinol exerts no therapeutic effect whatsoever, while chrysophanol-anthranol has a favorable influence, but inferior to that of crude chrysarobin. We then tried to isolate by fractional extraction the therapeutically active parts of chrysarobin; the fractions, however, were always inferior to the whole drug. Compounds of chrysarobin in which the hydroxyl group was combined with the acetyl radical, acetylchrysarobins, were prepared by us and tested out therapeutically. We found these compounds likewise inferior to chrysarobin. A number of other compounds prepared by us in which the hydroxyl groups of chrysarobin were partially or completely oxidized were therapeutically of little or no value; in general, it can be stated that any change in the chrysarobin molecule affecting the hydroxyl groups diminishes the therapeutic activity on the skin. We have produced a certain derivative of chrysarobin in which the hydroxyl groups appear to remain unaltered which has greatly interested us. This new drug has been tried out by ourselves and other dermatologists to whom it has been supplied, and the general feeling is that it is superior to chrysarobin. It is also preferable to chrys-

arobin in that it is much cleaner and freer of disagreeable staining properties. The mode of standardizing the preparation of this drug has not been satisfactorily concluded by us, and we shall therefore delay publication on this matter until a later date.

ABSTRACT OF DISCUSSION

DR. WILLIAM A. PUSEY, Chicago: I confess to the same skepticism concerning the value of a low protein diet in psoriasis that has been shown previously in discussing this subject. I am unable to reconcile the remarkable accumulation of nitrogen in these patients with the law of the indestructibility of matter, nor am I convinced that in eliminating from the diet protein we have solved the problem of the treatment of psoriasis. I admit that a reduction of the protein intake as well as in the quantity of food in general is a factor in the improvement that has been observed in these cases; and I also believe that the decrease in protein is more important than the decrease in the general diet; but a long and unhappy experience with psoriatic patients, who have been dieted most vigorously with food of a low protein content, has convinced me that in the diet we have but one factor in the etiology of this affection of the skin.

DR. G. W. RAIZISS, Philadelphia: As chrysarobin has long been known to give good results in psoriasis, it was interesting for us to learn more about the nature of the chemical processes which are involved in the action of the drug on the skin. Unna maintains that the favorable action of chrysarobin on the skin in this affection is due to the abstraction of oxygen from the cells of the skin, but this theory was never supported by experimental work. Our own experiments rather support the view of Unna that the reducing power of chrysarobin has something to do with its favorable influence on psoriatic lesions, but we found another important property in the drug, namely, that it had a remarkable chemical affinity for protein, especially the keratin elements of the skin. We applied a chrysarobin ointment to the skin of a rabbit, and after several days, when this section of skin was excised, it was found to be deeply stained with a chrysophanic acid-like color, and we could not separate the acid from the skin by any method which we employed. We also found that this staining could be accomplished by mere suspension of the drug in water, and again we could not remove the stain from the skin. This shows that chrysarobin has probably a remarkable chemical affinity for proteins, and that it apparently acts by precipitating the cell and robbing it of its vital properties by absorbing important proteins. Recent studies of chrysarobin show that it is not a single definite chemical compound; it consists of a number of chemically allied substances, and it was our aim to isolate some of these with the object of finding a principle which would be superior to the commercial drug. While none of the constituents of chrysarobin appeared to be of greater therapeutic value than the entire drug, one of many derivatives of chrysarobin, which were prepared by us and tested on the skin, gave good results. This substance is still the object of chemical and clinical studies.

DR. JOHN A. KOLMER, Philadelphia: Those of you who have done any work along these lines are aware of the fact that many varieties of cocci and diplococci are found in these lesions. We have not been able to identify any one of these as the active agent in psoriasis. The difficulties surrounding the work are increased because psoriasis is apparently not transmissible to the lower animals. Our results along these lines have thus far been negative. During the past year we have been mainly interested in studying the action of chrysarobin on psoriatic lesions and determining whether the drug had a germicidal action on any of these microorganisms. We have been able to grow cocci from psoriatic lesions in chrysarobin, showing that it has a very weak if any germicidal influence. This fact has been corroborated by control experiments. Calomel is absolutely insoluble in water, yet we found that this drug has a remarkable germicidal activity, equal to mercuric chlorid, and capable of killing organisms directly on the skin. This drug, however, has no recognized value in the treatment of psoriasis, and we have become convinced that chrysarobin does not act by any direct germicidal action on micro-organisms in psoriatic patches. It is probably by gradual deoxidation that chrysarobin destroys a micro-organism in psoriatic patches; what that particular micro-parasite is, is something yet to be discovered.

DR. WILLIAM S. GOTTHEIL, New York: How far was Dr. Schamberg able to carry his protein-free diet, and how long could he keep it up? Personally and in private practice I have found that the limit was soon reached; two weeks has been the longest that I have ever been able to keep a patient on it, and not with a very strictly protein-free diet at that.

DR. S. POLLITZER, New York: My own experience with a relatively low protein diet in psoriasis has not been so fortunate as that of Dr. Schamberg. Within the past year I have tried it in ten cases in private practice, all intelligent patients on whose word I could rely, who were kept on a diet as nearly free from nitrogen as it was possible to enforce, though, of course, they were not under hospital supervision. I am satisfied that they faithfully followed the prescribed diet, which excluded even peas and beans. None of these patients showed anything like the improvement reported by Dr. Schamberg: in fact, three of them developed new lesions in the third week of this diet. My own experience has been duplicated by many others, though that of Dr. Schamberg is by no means unique, and it is rather curious that such radically different results should have been obtained by different observers. I can only repeat my conviction, that there is some error in these findings. To take the most striking case: A girl of 40 kilos (88 pounds) "retained" 400 gm. of nitrogen during the four months of the experiment and actually weighed a little less at the end of the period than when she began. In other words, about 25 pounds of protein which this patient ingested has disappeared; it has not passed out again and, as her weight proves, it has not remained in her. I must insist that such a result is not only a contradiction of the laws of metabolism, but even a violation of the fundamental principle of the indestructibility of matter. The case which Dr. Schamberg presents as an answer to Tidey's criticism, that the authors' error lay in a failure properly to collect scales, proves too much. This psoriatic, who did not desquamate, also "retained" nitrogen. Now, the authors have explained the nitrogen "retention" as due to a specific nitrogen-hunger caused by the loss of protein in the scales. But here is a case that does not scale, cannot therefore have a specific nitrogen-hunger and yet "retains" nitrogen! A large positive nitrogen balance over a prolonged period without a corresponding gain in weight is in itself a proof of error in the observations.

DR. JAY F. SCHAMBERG, Philadelphia: Replying to Dr. Pollitzer, lack of time forbids me to enter into detail to prove that the figures presented present no inconsistence. Passing to another criticism, physiologic chemists are agreed as to what constitutes a nitrogen retention, and we have employed the term in the manner in which it is universally used by chemists. The chemists associated with me in our research are convinced that the results we have reported are not only possible but also correct. One who is a dermatologist and not a chemist is not warranted in branding the results as impossible and out of accord with physiologic chemical principles. In presenting these results, we have no theory to suggest or prove. We entered into this investigation with entirely open minds. I was at the outset skeptical as to the influence of diet in psoriasis, but I have been convinced practically against my will. Psoriasis may ultimately be proved to be a disease of purely parasitic origin. We are not advancing hypotheses as to the cause of the disease; we are presenting our laboratory and clinical findings and we place them before you for what they are worth, and for your careful consideration.

WHITE-SPOT DISEASE*

GEORGE M. MacKEE, M.D.
AND
FRED WISE, M.D.
NEW YORK

The designation "white-spot," as applied to a definite clinical entity referable to the skin, was first employed by Westberg in 1901. He used the term "white-spot" merely as a descriptive adjective, qualifying a supposedly unknown dermatosis. In 1903, Johnston and Sherwell published the second paper on the subject, giving it the title of "White-Spot Disease." In this paper reference was made to Westberg's case and to Montgomery's case of white-spot disease which was exhibited before the American Dermatological Association in 1901, a report of which case was later published in full. Sherwell subsequently exhibited another case of this disease before the New York Dermatological Society in 1904. By that time a number of dermatoses, characterized by the presence of white spots of one kind or another, were reported in the dermatologic literature of America and Europe.

During the past ten years a very substantial literary structure has reared itself on the foundations of Westberg's and Johnston and Sherwell's papers. A careful and thorough perusal of the writings on the subject

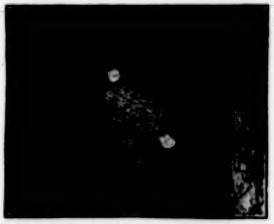


Fig. 1.—The two lesions on the penis. Note the annular appearance, due to the snow-white border and the mother-of-pearl or bluish-white center. Note, also, the crenated border.

of white-spot disease has given us the impression that the cases deserving to be placed in the same category with those of Westberg and Johnston and Sherwell are by no means numerous. Highly instructive and interesting contributions to the subject have been rendered by some of the master minds of dermatology both here and abroad. Of these dissertations, however, valuable as they are, only a few actually deal with the subject of so-called white-spot disease.

As is the case with so many other unclassified dermatoses in which the etiology is purely conjectural, the clinical picture not clearly defined and even the microscopic changes more or less obscure and difficult of interpretation, the study of white-spot disease has led investigators far afield in their attempts to place it into its fitting nosologic position with relation to allied cutaneous changes. Thus, in the excellent contributions of Vignolo-Lutati, Riecke, Hazen, Petges and others, we find that these authors evidently considered it necessary, for a thorough presentation of the subject, to digress considerably from the main theme. For they deal not only with white-spot disease *per se*, but also with morphea guttata and scleroderma circumscriptum, as well as the card-like scleroderma of Unna, the lichen albus of von Zumbusch, the lichen planus atrophicus and sclerosus of Hallopeau, the dermatitis lichenoides chronica atrophicans of Csillag, the neurodermatitis alba of Kreibich, the nevus anemicus of Voerner, the multiple keloids with scar-like atrophies of Jadassohn, the white, atrophic and scar-like perifollicular spots on the trunk of Iwanow, the morphea with maculae atrophicae of Duhring, the circumscribed scleroderma of Zarubin, the white spots found in various chronic diseases such as leprosy, dermatitis herpetiformis and a number of other morbid cutaneous processes of more or less remote relationship to white-spot disease.

We have read and studied the entire literature relating to white-spot disease and have found it necessary to write an article of sixty-five typewritten

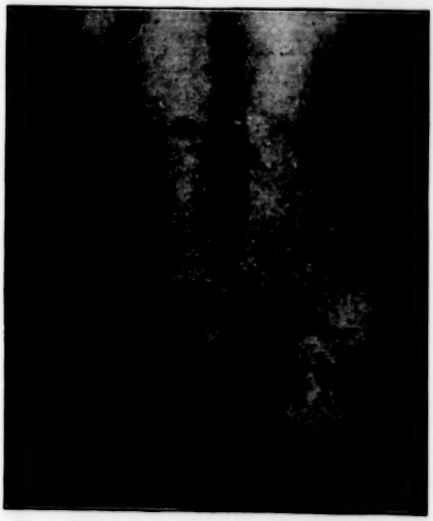


Fig. 2.—White spots occurring in dermatitis herpetiformis. Such lesions are found in pediculosis corporis, acne vulgaris, lepra, etc. They have nothing in common with the lesions of white-spot disease.

pages in order to give credit to the various authors, and properly to express and support our contentions. In the fifteen minutes at our disposal it is, of course, impossible to do more than to give the essential clinical and histologic details of the cases under our personal observation and to give the conclusions we arrived at after a careful study of the question. If at this time we do not seem to be fair to other investigators and if we do not appear to prove our contentions, we ask our colleagues to await the publication of the entire article before criticizing our findings.

Evidently, a judicious scheme of elimination would seem desirable in order to clarify the subject, at least so far as our present-day knowledge will permit. In order to avoid confusion it would appear to be a good plan to omit the polemic discussion of the cutaneous changes which obviously have but little if any bearing

* Read before the Section on Dermatology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

* From the Dermatological Department of the College of Physicians and Surgeons, Columbia University.

on the subject of white-spot disease or morphea guttata or circumscribed scleroderma, in any of their varied clinical and pathologic manifestations. Interesting as these remotely related disease-processes undoubtedly are, it can hardly be said that their inclusion in a discussion dealing with white-spot disease is in any way conducive to a clear understanding of an already involved subject.

We shall at once exclude all but three groups of cases. These three groups consist of the unclassified group, consisting mainly of the cases of Westberg, Johnston and Sherwell, Hazen and Riecke; the sclero-

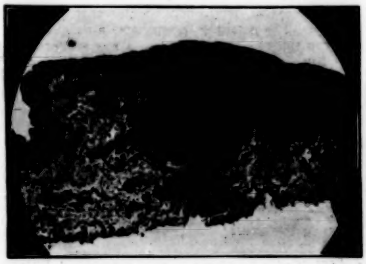


Fig. 3.—Acanthosis over center of lesion (from microphotograph, first biopsy, low power). Under this is a triangular-shaped area of cellular infiltration with its apex at lower part of reticular layer. At base of triangle is a large area of degeneration. This area contains a crystalline deposit (artefact) which shows in the picture.

derma group and the lichen planus sclerosus group. Following the lead of Montgomery and Ormsby, Petges and others, we believe that lichen planus sclerosus, which is the same disease as lichen albus, while having clinical and pathologic features resembling, to a certain extent, localized scleroderma, can be clearly differentiated. We, therefore, exclude the lichen planus group. This leaves for consideration the four or five unidentified cases and the cases that have been clearly shown to belong to scleroderma.

We will state here that we believe the term "white-spot disease" should be retained, but limited to cases that can be grouped with scleroderma, accepting Unna's card-like scleroderma as the type.

In other words, our conception of scleroderma is a broad one and in a way may be likened to that of syphilis, in which there are a number of different cutaneous eruptions. In this way we would have white-spot disease represent a distinct type of scleroderma just as morphea is a distinct type of scleroderma.

CHARACTERISTICS OF THE DISEASE

The clinical findings in the reported cases have varied to a considerable degree, but we believe that this is merely an expression of the various stages of evolution. We present herewith a composite clinical picture of the affection.

White-spot disease occurs mostly in females, especially in those of a neurotic temperament. It may occur in childhood and in early and late adult life. Most of the reported cases were in the third and fourth decade. The disease is essentially chronic in its course, the lesions making their appearance insidiously and developing slowly. Aside from moderate pruritus at the beginning, subjective symptoms are rare. The sites of predilection are at the base of the neck, in front and behind, the upper portion of the chest and back, but the lesions may appear on the extremities, various portions of the trunk, on the genitals, etc.

The essential lesion is a small white spot. The color may be snow white, ivory white, bluish-white, etc. The lesions may vary in size from a pin-head to a dime. They may be isolated, sparse and widely scattered, or they may be numerous, grouped and confluent. The surface may be smooth or wrinkled, glistening or dull, depressed or slightly elevated or level with the surrounding skin. There may be slight telangiectasia. The center of the lesion may appear depressed. There may be a violaceous areola. They may contain horny plugs and they may be scaly.

To the palpating finger the lesions may be imperceptible, or they may impart a sense of resistance.

It is far more difficult to give a composite picture of the histopathology because most of the cases differ, especially with regard to details. In the majority of instances there was a thickening of the horny layer. In a few cases there were dilated follicles filled with keratin. The granular layer and the rete were thinned, the basal layer irregular and the interpapillary prolongations lost. There were usually a number of spaces directly under the epidermis which were probably dilated lymph-vessels. This fact is rather interesting because Unna considers these spaces partly responsible for the white color.

The chief changes in the derma consist, in the early stages, of a more or less circumscribed area of perivascular round-cell infiltration, edema and other signs of inflammation. Later, there is a marked increase of connective tissue, the infiltrate, except at the periphery, disappears and the blood-vessels and lymph-spaces diminish in number and size. Elastic tissue is usually lost or greatly diminished. In other words the general picture is that of scleroderma.

Fig. 4.—Epidermis sinuous (from microphotograph, second biopsy six months later, low power). Loss of interpapillary prolongations. Disappearance of cellular infiltrations. Hypertrophy of collagen.

REPORT OF CASE

Before going any further we desire to place on record a case of white-spot disease that was observed in Dr. Fordyce's clinic.

Patient.—Man, aged 43. The eruption had existed for four months. The patient stated that he noticed the four lesions at the same time and that they had not changed in appearance since he first noticed them. We were unable to decide whether the lesions had developed slowly or suddenly. There were no subjective symptoms. Syphilis and tuberculosis were excluded.

Examination (November, 1913).—The patient is a tall, thin man of distinctly neurotic type. A general physical examination revealed nothing of interest. The entire cutaneous surface, including the visible mucous membranes, was normal, with the exception of the lesions about to be described. There was absolutely no sign of lichen planus. The eruption consisted of four lesions, two of which were on the dorsal

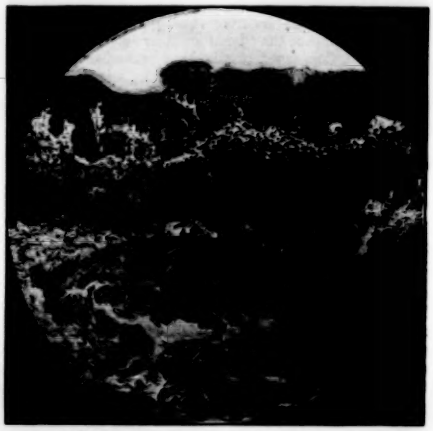


Fig. 5.—Tissue removed from a lesion which closely resembled white-spot disease. The histologic picture is that of lichen planus. Note the extensive subepidermic vacuolization.

surface of the penis and two on the anterior surface of the scrotum. They were all about the same size, roughly speaking, about 0.5 mm. in diameter. The lower penile lesion was a little larger than the others. There was a marked disk-like configuration, with a well-defined, slightly irregular or crenated border. The penile lesions appeared as though they were embedded in the skin, like mosaic; this appearance was less marked in the scrotal lesions. Palpation revealed slightly perceptible infiltration, but there was no distinct sense of resistance. The margin was, perhaps, very slightly elevated, while the center was apparently depressed and from a clinical point of view seemed to be slightly atrophic. The color was the most sriking feature. The border of each lesion was an opaque, glistening white, resembling porcelain. The center was semitranslucent and bluish white, resembling mother-of-pearl. The upper penile lesion was surrounded by a slight violaceous band. The surface of the lesions was smooth.

The patient was not seen again until the latter part of May, 1914, after an interval of six months. There was no change in the clinical appearance of the lesions.

Histopathology.—Both of the penile lesions were excised in their entirety for the purpose of histopathologic study. The upper lesion was removed in November, 1913, and the lower one in May, 1914.

First Biopsy: The central part of the lesion shows a general hypertrophy of the epidermis with a central depression or dell. The interpapillary pegs have united to form a broad plate. The horny and granular layers are thicker here than in any other portion of the section. The rete is also increased in thickness; the cells stain poorly and the prickles are indistinct; a number of the cells have lost their nuclei. The basal layer is irregular, vacuolated and is not sharply differentiated from the underlying cutis.

Derma: In the center of the lesion the derma is occupied by a somewhat triangular-shaped area of small round-cell infiltration with the base of the triangle close to the epidermis, and its apex situated in the lowermost portion of the reticular layer. This infiltration consists for the most part of lymphocytes, with plasma-cells and fibroblasts scattered throughout the area. Where the infiltration is most dense, collagen is practically absent. There has been an increase in the number of capillaries but most of the vessels have been occluded by endothelial proliferation and by the compression exerted by the cellular infiltration. Just under the epidermis and extending the full width of the diseased area, is a zone of colliquative degeneration or necrosis. Here the tissue elements are no longer discernible. In a few sections a large subepidermic cavity was noted in the degenerated area. This was occupied by a homogeneous mass containing a few cells and reminded us of a similar condition found in Johnston and Sherwell's case.

At the margin of the lesion the interpapillary pegs are flattened out. The papillary layer shows a condensation with subepidermic spaces. Here there are a few scattered lymphocytes, plasma-cells and chromatophores. In the reticular layer the collagenous bundles are composed of very coarse fibers, separated here and there by edema. There are a few circumscribed areas of round-cell infiltration closely limited to degenerated and occluded vessels. The only appendages noted were a few coil-glands which appeared to be dilated and were surrounded by a moderate round-cell infiltration.

Second Biopsy: The epidermic changes consist of an entire flattening out of the interpapillary pegs. The horny and granular layers and the rete appear normal.

Derma: There is a distinct fibrosis, hyperplasia, in the upper two-thirds of the cutis. The tissue is dense and stains deeply with eosin. Here we find large, coarse, wavy fibers. In the upper corium the blood-vessels are reduced in number and size; the endothelium is prominent. There are a few areas of moderate perivascular round-cell infiltration. In the rest of the corium the only cells found are fibroblasts. In the lower third of the cutis the collagenous tissue consists of a fine network of delicate fibers producing the appearance of areolar tissue. Elastic tissue is present directly

Fig. 6.—Tissue removed from a lesion conforming clinically to white-spot disease. The atrophy of the epidermis, loss of rete pegs, sclerosis of papillary layer and upper reticular layer together with underlying zone of infiltration, points to lichen planus sclerosus. Illustration taken from Fordyce's article on lichen planus (*Jour. Cutan. Dis.*).

under the epidermis. Then there is a narrow zone extending through the lesion where the elastic tissue is either absent or badly fragmented. Lower down it again appears and, with the exception of some fragmentation, is practically normal.

Summary.—The disease apparently began as an inflammation with a perivascular infiltration of small round cells. These areas then united to form a diffuse infiltration in the center of the lesion. The inflammation was apparently intense enough to produce degenerative changes in the upper part of the corium. The epidermic changes were probably secondary.

Sections made from tissue obtained six months later show a disappearance of the inflammation with hypertrophy of collagen, loss of vessels, elastic tissue and rete pegs.

We also studied three cases of lichen planus sclerosus, representing three different stages of evolution, but these cases will not be reported here.

It will be recalled that we accept, as examples of white-spot disease, twenty cases that have been definitely identified as scleroderma and that we excluded lichen planus sclerosus and many other conditions.

This leaves for discussion the unclassified cases reported by Westberg, Johnston and Sherwell, Hazen and Riecke. Unfortunately, time will not allow of a discussion of the details of these cases so that we can only give our conclusions concerning them. Our early lesion showed the loss of collagen reported by Johnston and Sherwell and by Hazen. Montgomery and Ormsby and Unna also noted loss of collagen in early lesions. Our late lesion depicted the hypertrophy of collagen and other changes observed by most investigators. If we had been compelled to rely entirely on the histologic findings in our early lesion our case would have been classed in the group containing Johnston and Sherwell's and Hazen's cases. On the other hand, if we had only the later lesion to study, the case would have been added to the scleroderma group. We assume, therefore, that if these investigators had been able to study their cases at different stages of evolution, an entirely different conclusion would have been reached. We believe that our case combines the unclassified cases of white-spot disease with the cases falling under the general heading of scleroderma.

Fig. 7.—Tissue removed from a lesion in a case of lichen planus presentinf lesions simulating white-spot disease. Atrophy of epidermis. Rete pegs almost obliterated. Sclerosis of papillary layer. Hypertrophy of collagen of reticular layer. Blood-vessels markedly reduced in number. No infiltration.

CONCLUSIONS

White-spot disease is a special form or type of scleroderma which can be differentiated, both clinically and histologically, from other affections with white lesions.

Lichen planus sclerosus and atrophicus or lichen albus, although giving rise to white lesions, has nothing in common with white-spot disease.

The unclassified cases of white-spot disease, such as those of Westberg, Johnston and Sherwell and Hazen, belong to the scleroderma group and, therefore, are true examples of white-spot disease.

The discrepancies in histologic and clinical findings are due to the fact that the studies were made at different times with respect to the evolution of the disease.

We desire to thank Dr. John A. Fordyce for his kindness in placing at our disposal the material that forms the basis of this study. We wish to express our gratitude to the staff of the Dermatological Laboratory for the careful technical work. We especially desire to thank Dr. Elizabeth C. Jagle for her aid in the study and interpretation of difficult material.

ABSTRACT OF DISCUSSION

DR. H. H. HAZEN, Washington, D. C.: Drs. MacKee and Wise were most fortunate in being able to perform biopsies at such varying intervals, and to demonstrate that a process originally showing rarefaction of the corium may eventually terminate in morphea. It would seem that they have solved the question of the various unclassified cases, my own among the number, of white-spot disease, and that these cases are true scleroderma. While I have lost sight of my patient I know where she is living and shall try to obtain more tissue from her in the hopes of confirming the observations of Drs. MacKee and Wise.

DR. F. W. CREGOR, Indianapolis: I direct attention to the similarity between the histopathologic picture presented by Dr. MacKee in this case and that given by Dr. M. B. Hartzell in connection with his paper on granuloma annulare. I previously made the statement that I had not heretofore considered granuloma annulare an entity, and now, in comparing these two histopathologic pictures, I must confess that if each were an entity I would have great difficulty in differentiating one from the other microscopically.

RADIUM

ITS USE AND LIMITATIONS IN SKIN-DISEASES *

FRANK E. SIMPSON, M.D.

CHICAGO

The scope of this paper is limited to the use of radium in dermatology.

In radium therapy everything depends on the proper equipment and the technic.

For dermatologic cases I have used varnish applicators of different types.

A useful style of apparatus is the so-called "toile" or flexible linen applicator. One apparatus of this type is rectangular in shape, covers 12 sq. cm. of surface and is of one-twentieth strength.

Other applicators have metal instead of linen backs, are square or round and are of one-fourth, one-half or full strength. As the applicators are constructed so

* Read before the Section on Dermatology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

that 10 mg. of the radium salt are spread over 1 sq. cm. of surface, a one-twentieth-strength applicator contains about 0.5 mg.; a one-fourth-strength, 2.5 mg.;

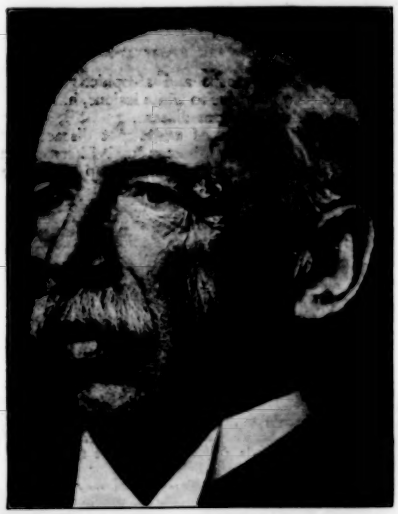


Fig. 1.—Epithelioma of left temple; photograph taken May, 1913.

Fig. 3.—Epithelioma of right side of face; photograph taken July, 1913.

a one-half-strength, 5 mg., and a full strength, 10 mg. of radium sulphate to each square centimeter of applied surface. Many authors prefer the use of a nomenclature that will express the amount of radium element instead of radium salt in each square centimeter of the applicator, a terminology that has much in its favor.

The chief advantage of the varnish applicators over other styles of apparatus lies in the uniformity of their

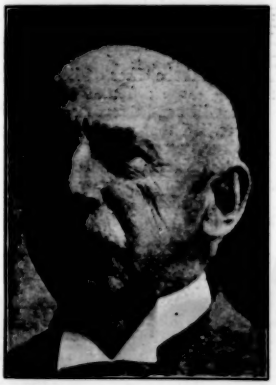


Fig. 2.—Patient in Figure 1, after eight hours' treatment with ¼-strength radium applicator screened with 0.1 mm. silver; photograph taken July, 1913; no recurrence to present time.

action over their entire surface. Certain types of radium applicators produce a more intense reaction at the point of application than at the periphery of a lesion, which is an obvious disadvantage.

The technic of radium treatment is extremely varied

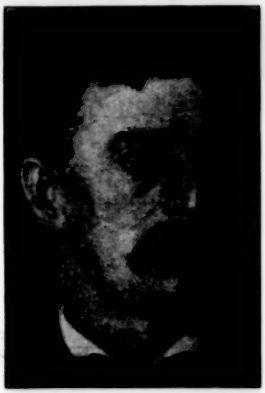


Fig. 4.—Patient in Figure 3, after ten hours' treatment with ¼-strength radium applicator screened with 0.1 mm. silver; photograph taken October, 1913; no recurrence to present time.

and can be learned only by a certain amount of experience with each applicator.

In general, one uses the apparatus either naked, that is, wrapped only in rubber tissue, or with screens of metal interposed between the applicator and the

skin. Lead, silver, aluminum, brass and platinum have been largely used as screens, but a tendency is now noted toward the discontinuance of lead screens on account of the irritating secondary rays developed when the radium rays pass through lead. I have commonly used screens of aluminum or silver which are

Fig. 5.—Lupus erythematosus of nine years' duration, symmetrically involving nose and both cheeks; photograph taken February, 1913.

Fig. 6.—Patient in Figure 5 after treatment with ¼- and ½-strength radium applicators unscreened; photograph taken April, 1914.

covered with from five to ten thicknesses of black paper to absorb the secondary rays, the whole apparatus being then enveloped in rubber tissue and applied to the skin by adhesive or rubber bands.

Radium reactions in the skin have sometimes been compared too closely with Roentgen-ray reactions. In general, radium reactions are much more benign than Roentgen-ray reactions, and when destructive inflammation has been produced, healing is much less slow and uncertain. This is especially true of the reactions in which beta-rays predominate, but even severe gamma-ray reactions are more benign than severe Roentgen-ray reactions.

In order to limit my remarks, only three groups of diseases will be touched on at this time: epithelioma, lupus erythematosus and angioma.

EPITHELIOMA

It has been sufficiently demonstrated that radium is a very efficient agent in epithelioma of the skin. Up to the present time I have treated about forty cases. To a certain extent these were selected cases, being of the type usually treated by the dermatologist. In two of these cases success was only partial; but healing, I believe, might have been brought about had I been able to continue the treatment. The general experience, however, leads to the belief that certain epitheliomas are probably resistant to radium as well as to other forms of actinotherapy, while other cases are too far advanced to be materially benefited. It would be premature to try to draw conclusions at present as to the relative efficiency of radium and the Roentgen ray in epithelioma. Both agents, I believe, have distinct fields of usefulness in this disease.

Epithelioma may be healed with radium, applied without or with a screen. Without a screen, an epithelioma 2 or 3 cm. in diameter and not too deeply situated may be healed with a one-fourth-strength applicator in five or six treatments of an hour each. With a screen of 0.1 mm. of silver, eight hours may be required. Recently I have made more frequent use of screens in order to limit the inflammatory reaction and because experience has shown that the deeper parts of the growth are probably better reached. An epithelioma can also be healed with a single massive dose of heavily screened radium, but I have hitherto preferred to use fractional doses. The method

Fig. 7.—Lupus erythematosus of eight years' duration involving right cheek and upper lip; photograph taken February, 1913.

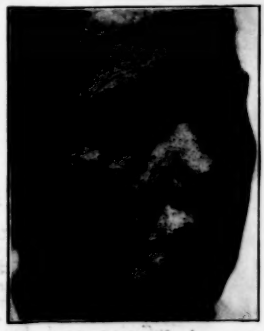


Fig. 8.—Patient in Figure 7 after treatment with ¼- and ½-strength radium applicator unscreened; photograph taken July, 1914.

of operation is determined solely by the nature of the growth and the convenience of administering the treatments. The cosmetic results are equal if not superior to those obtained by any other method.

Fig. 9.—Cavernous vascular nevus of upper lip; photograph taken April, 1914.

Fig. 10.—Patient in Figure 9 after treatment by "cross-firing" with ¼- and ½-strength radium applicators screened with 0.1 and 0.5 mm. silver; ten exposures of fifteen minutes each; nevus was removed without visible inflammatory reaction; treatment not quite completed; photograph taken May, 1914.

While the treatment of internal cancer with radium is not germane to the present discussion, a few remarks may be made on this important topic. In general the present attitude of most workers with radium in cancer of the deeper structures is one of strict conservatism. Few writers go so far as Bumm,[1] who believes that in the future cancer will be treated by radiotherapy. Most authors agree with Wickham and Degrais,[2] who in a recent article take the position that radium is to be regarded strictly as an adjunct to surgery.

The general opinion seems to be that operable cancers should be operated on. Radium may be of great value prior or subsequent to operation. Inoperable cancers may be treated with radium to minimize suffering and perhaps prolong life. Inoperable cancer in some situations, as in the cervix uteri, may be wonderfully relieved symptomatically. Under radium treatment a few inoperable cancers in various situations have been made operable and a few have apparently recovered.

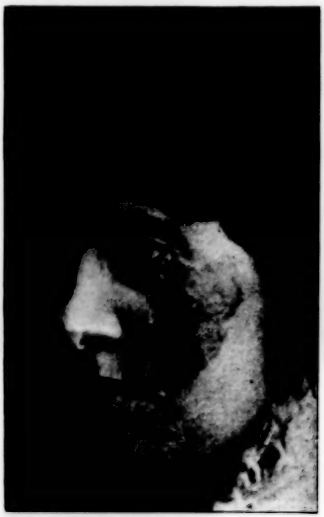


Fig. 11.—Vascular purplish-red nevus, irregularly elevated and deeply infiltrated; photograph taken September, 1913.

Fig. 12.—Patient in Figure 11 after treatment with ¼- and ½-strength radium applicators unscreened; nevus was removed with three series of exposures of about four hours each; the small patch at corner of mouth has not been treated; photographed May, 1914.

LUPUS ERYTHEMATOSUS

About twenty cases have been treated. In view of the intractable nature of this disease, the results of radium treatment are on the whole very encouraging. In selected cases I have been able to obtain complete involution of the disease. Unfortunately, relapses may occur; but these so far have yielded to persistent treatment. The painless character of the applications enables one to pursue the treatment vigorously. The technic has much to do with success or failure. The chronic "fixed" types are best treated with destructive doses. Experience with this disease has led me recently to prefer screened radium. I now use in the average case a one-fourth- or one-half-strength applicator screened with 0.1 mm. of silver, and treat each patch from about four to six hours in the course of two weeks. The inflammatory reaction is thus ren-

1. Bumm, E.: Further Results with Radium Therapy in Carcinoma, Berl. klin. Wchnschr., 1914, li, 193.
2. Wickham and Degrais: Can Radium Be of Value to Surgery in the Treatment of Malignant Tumors? Fortschr. a. d. Geb. d. Roentgenstrahl., 1913, xxi, 333.

dered less severe than when naked radium is used. Unfortunately, some patients, when they first come under observation, are more or less scarred by the disease or by previous treatment. Even in these cases the cosmetic result is sometimes quite satisfactory. In selected cases of not too long duration or of too large area a very good cosmetic result has been obtained.

ANGIOMA

The results obtained in certain types of nevus vascularis (birth-marks) are superior to those hitherto obtained by any other method. In a certain number of angiomas radium offers the only practical method of treatment. It is particularly successful in the angiomas of children on account of its painlessness.

Large flat angiomas (port wine stains) of deep red color can often be treated with a good cosmetic result. While amenable to several different technics, "port wine stains" are most successfully treated by giving just enough raying to produce a marked erythema with desquamation. With a one-twentieth-strength applicator screened with 0.01 mm. of aluminum the proper amount of reaction can be produced in about four or five hours. Several repetitions of this treatment will often result in a satisfactory decolorization.

Elevated, papillomatous angiomas must be treated with slightly stronger doses in order to level the surface and bring about decolorization. With a one-fourth-strength applicator, unscreened, an exposure of from two to four hours may be given in fractional doses. When the reaction subsides, the series of treatments may be repeated if necessary. Several courses of such treatment will usually bring about the desired result.

With certain types of cavernous angiomas in children, a reduction and leveling of the tumor can sometimes be produced without visible inflammatory reaction. This shows the specific and selective action of radium on the blood-vessels. In these cases I have used either a one-half- or one-fourth-strength applicator screened with 0.1 mm. of silver, and have given exposures of fifteen or twenty minutes' duration.

To attain the best results in angiomas, infinite care and attention to detail are needed. While the cosmetic results are naturally not always absolutely perfect, the enormous improvement is so noteworthy as to be nearly always satisfactory to patients. In selected cases an almost perfect cosmetic result can be obtained.

59 East Madison Street.

THE RELATIVE VALUE OF RADIUM IN DERMATOLOGY*

ARTHUR F. HOLDING, M.D.

NEW YORK

On account of the extravagant exploitations of radium by the profession as well as by laymen, a statement as to its actual value as a therapeutic agent (at present) may be enlightening. The majority of physicians are not in a position to judge the merits of this element, because its scarcity and high price place it beyond their reach. Judging from the unusual publicity accorded the discovery of this new chemical, with its marvelous physical properties, it was logical to expect that the therapeutic results would be quite phenomenal; but such results take years to perfect. The premature, hothouse exploitation of radium, hybridized by a cross between its unusual phenomena and the publicity given them, have resulted in disappointment, which was to be expected. After the initial period of exploitation, every new therapeutic agent goes through an evolutionary period in the hands of those who are scientifically inquisitive, and eventually its true value is established. For instance, the Roentgen rays, which were discovered seven years before the discovery of radium, are now just beginning to be employed scientifically, and it will be some years hence before the prejudice and skepticism resulting from premature, unscientific and extravagant exploitation of the Roentgen rays can be dispelled. In the same way the preposterous claims of radium fanatics provoke one to an underestimation of its value.

For two purposes one must acknowledge that radium has greater possibilities than any other similar agent in use at present, namely, (1) in diseases of faulty metabolism, in which the radium emanatorium may be used, and (2) in malignant lesions of cavities, in which the neoplasm is inaccessible or difficult to expose to direct application of Roentgen rays, such as the esophagus, rectum, vagina, urinary bladder, fauces, etc.

The application of radium to benign growths is unnecessary in my opinion, because benign conditions can be controlled more quickly and easily and with less expense by the electric desiccation method of Clark, and by massive doses of Roentgen rays.

One fact that would seem to justify hopes of superior results from radium is that the most penetrating Roentgen rays in use represent the output of a 60,000 to 100,000 volt current, while it is estimated that an electric current of from 600,000 to 1,000,000 volts would be necessary in order to produce Roentgen rays of as great penetration as the most penetrating rays of radium, that is, currents ten times greater than the strongest currents now employed for the Roentgen rays. Previous to the advent of improved Roentgen-ray tubes of the Coolidge type this argument was more convincing than at present; with the penetration of the Roentgen rays completely under one's control, it is reasonable to hope that Roentgen rays can soon be generated, having nearly as high a penetration as the gamma rays of radium, and it is certain that Roentgen rays can be produced from electrical sources in greater quantity and at less expense than the gamma rays of radium can be obtained.

The field of usefulness of radium has been greatly increased since the employment of radium emanations. The bulk of radium is so small that formerly it could be applied only to limited areas. The present method is to draw off the emanations of radium into glass capillary tubes, which retain for about twenty-four hours a radio-activity approximately equal to that of the original radium. A lesion of any size can be covered by these glass tubes, arranged parallel to each other. By the addition of fresh emanation each day to these mats of parallel tubes the radio-activity can be continued indefinitely. In the field of local applications to lesions of the skin and mucous membrane the agents to be compared with radium are electrical desiccation (Clark), ultraviolet rays (as applicable from a Kromayer lamp), massive doses of Roentgen rays of controllable penetration (Coolidge), surgery and destruction by caustics, cautery or cold. In com-

* Read before the Section on Dermatology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

paring the relative value of these methods eight points should be considered.

1. Cost: Radium is far more expensive than any of the other methods. Massive Roentgen rays, electric desiccation and ultraviolet rays come next in expense. Surgery and caustics are the cheapest.

2. Ease of Application: As to ease of application, much depends on the training of the person who administers the treatment. Each therapeutist will naturally do the best work with the greatest ease by employing that agent with which he is most familiar. Other things being equal, radium and caustics are easier to apply than the other agents in question.

3. Time Consumed in Treatment: Radium applications are much longer in duration than any of the other methods. They require hours while the other treatments require minutes.

4. Pain: Radium, Roentgen-ray and ultraviolet light treatments in proper dosage cause no pain. Electric desiccation and carbon dioxid snow cause slight pain. Surgery and cauterization are very painful and require a local anesthetic. Chemical caustics are the most painful.

5. Cosmetic Effects: Cosmetic effects are best after radium, Roentgen rays, ultraviolet light, desiccation and carbon dioxid snow, and poorest after surgery or cautery.

6. Dangers: With a proper technic there are no dangers in any of these methods. Poor technic is a *de facto* contraindication for the use of any agent.

7. Superficial Healing and Deep Extension: The well-demonstrated superficial healing powers of radium and the Roentgen rays should not mislead one into attempting to cure too extensive a lesion with these agents alone, lest the lesion make deep inroads while valuable time is wasted on superficial healing.

8. Indications in Dermatology: Non-malignant and skin conditions, such as warts, moles, nevi, acquired blemishes like tattoo marks or keloids, lupus, ureteral caruncles, mycosis fungoides, blastomycosis and acnes can most readily be controlled by electric desiccation (Clark). If one has the equipment, massive doses of Roentgen rays, carbon dioxid snow and ultraviolet rays may be used in these conditions with advantage. Radium will give good results, provided the radium and time necessary are available. For superficial lesions surgery is contra-indicated, because better cosmetic results can be obtained with less danger and less pain by non-surgical methods. Psoriasis, eczemas and skin-diseases due to faulty metabolism should be treated first by systemic measures, including radium emanation, if available. When this does not produce the desired results, electrical methods such as massive Roentgen rays are indicated. In deeper malignant conditions of the skin, the following therapeutic program should be adopted:

1. Massive Roentgen deep therapy or massive radium deep therapy.

2. Complete radical operation, preferably by bloodless methods such as thermopenetration, electrocautery, or massive caustics (Stroebel).

3. Effulguration (de Keating-Hart) into the wound.

4. Postoperative Roentgen deep therapy or massive radium deep therapy.

In hopeless malignant skin conditions the patient's symptoms can frequently be much ameliorated by massive deep roentgenotherapy or radiotherapy.

103 Park Avenue.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. SIMPSON AND HOLDING

Dr. William Duane, Boston: Radium is continually producing radio-active gas, and when the gas comes in contact with any material substance, that substance in turn becomes radio-active. In a small glass tube, containing the gas, I placed a thin sheet of steel and it also has become radio-active, as can be easily demonstrated by breaking the tube, removing the steel and holding it near a phosphorescent salt. Some years ago I suggested that sheets of metal or other substances, made radio-active in this way, should be used instead of the radium itself in the treatment of cancers. This method has certain advantages over the use of radium itself. It is very flexible. The applicators may be of any size and shape desired, and may have any strength. They will lose their activity after a certain time, and are then of no further value until again exposed to the radium emanations. A number of cases have been treated by the staff of the Harvard Cancer Commission at the Huntington Hospital by this method of deposited activity. The most complete removals of malignant tumors we have observed so far, were treated in this way. Dr. Simpson is correct in his statement concerning the differences between the Roentgen rays and the radium rays. Physical scientists tell us that four kinds of rays come from radium, the alpha-, beta-, gamma- and delta-rays. It is known that the gamma-rays are similar but not exactly the same as the Roentgen rays. During the past two years much important work has been done on these rays, and we have learned that Roentgen rays are very short waves of ultraviolet light. Gamma-rays are still shorter. The alpha- and beta-rays are of a totally different nature. They are corpuscular and not regular waves. We also get two kinds of rays from the Roentgen-ray tube; one depends on the tension of the tube and the other on the antikathode. In answer to Dr. Dyer as to how long a piece of metal will remain active after being exposed to these radium emanations, the activity will last on an average of a little over an hour, gradually dropping to zero. The dosage can be accurately measured, as it always follows the same law. A tube of this kind filled with radium emanation will lose one-half its strength in four days; in four more days it will again be one-half weaker, and so on, losing one-half its strength every four days.

Dr. Isadore Dyer, New Orleans: What method does Dr. Duane employ in obtaining these radium emanations? Is it necessary to use a glass tube? How long does the steel or other substance used remain radio-active?

Dr. Henry C. Baum, Syracuse: How long can the metal remain in the unopened tube before losing its activity?

Dr. Fred Wise, New York: What factors are necessary to produce a lesser or a stronger activity?

Dr. Jay F. Schamberg, Philadelphia: I have had some experience with radium during the past seven years, but have not had a sufficient quantity to produce the effects that Dr. Simpson has achieved, and with the amount at my disposal I have not grown wildly enthusiastic concerning its effects on cancers of the skin, in which I have seen equally good results obtained with the Roentgen ray. Radium has one distinct advantage over the Roentgen ray—the constancy of the dosage. With radium one knows the exact amount of energy that is given forth; we secure a constant effect from a certain quantity in a certain time from a certain distance. Despite the various energy-measuring devices that have been used to secure precision of dosage of the Roentgen ray, there is still latitude for error. Radium also has the advantage of simplicity of application and of applicability to certain cavities of the body which are inaccessible to the Roentgen rays. Another advantage is the kindliness with which radium burns heal. I had an experience with this on my own skin, on which an experimental radium burn, although deep enough to produce necrosis, healed promptly without pain, leaving only a slightly depressed scar. A Roentgen-ray burn of the same depth would have caused more trouble.

DR. WILLIAM A. PUSEY, Chicago: I have used radium in a glass capsule for many years, and in an applicator for the past year or two, and in spite of all the care and judgment I could exercise, I have been unable to distinguish any difference whatsoever between radium and Roentgen-ray reactions. The radium burns with which I am familiar are produced by an abundance of the beta-rays as well as the gamma-rays, and they are identical with the burns produced by the soft Roentgen-ray tube. They produce the same kind of vesication with a necrotic pellicle, and, contrary to Dr. Schamberg's experience, heal with the same relative benignness. I see no difference whatever in clinical effects, between radium and the Roentgen ray. My standard of radium work has been Wickham's book—confined largely, I must confess, to a study of the pictures—and I can duplicate from my work with the Roentgen ray any of the results of the radium treatment shown in Wickham's book, including his results in the treatment of vascular nevi. The results of the radium and the Roentgen rays are due to the effect of actinic energy on the skin, and the actinic properties of both are identical as far as we can judge by all physical criteria. We are at present going through such a brain storm about radium as we went through with the Roentgen ray about ten years ago. We have gone into ecstacies about radium in cancer but the fact should be clearly fixed in our minds that in radium we are using a form of radiant energy similar to what we have been using for the past ten or fifteen years in malignant and pseudo-malignant growths throughout the body. We are destroying these cells wherever they are accessible but not where they are not accessible, and therefore we are not curing with radium lesions that are beyond the reach of radiant energy. We have not cured malignant growths in the cavities of the body with Roentgen rays; it is not now being done with the new "deep methods" with Roentgen rays or with radium, and the claims which are being made now for radium—as well as for the German "tiefen therapie" with Roentgen rays, are, in view of what we already know, unscientific and unreliable.

DR. GEORGE M. MACKEE, New York: I regard the action of radium and the Roentgen ray as practically identical, and I doubt if there is any lesion, not excepting nevi, that can be affected by radium that cannot be equally well treated with the Roentgen ray. While radium can be more easily applied to lesions in cavities, especially the mouth, yet, unfortunately, here the new growths are so malignant that I doubt whether radium is of much value in their treatment, except occasionally. I was much surprised to hear Dr. Schamberg say that the dosage of radium could be so much more readily gauged than that of the Roentgen ray. My view is exactly the opposite. The dose of the Roentgen ray can be gauged with almost absolute accuracy, as for instance in ringworm of the scalp, for which accurate dosage is absolutely essential. One disadvantage of the radium application, as compared to that of the Roentgen ray, is that the former must sometimes be continued for from four to twelve hours to get exactly the same result that could be obtained by one application of the Roentgen ray lasting from one to fifteen minutes. Dr. Duane's point concerning the deposited activity of radium was interesting. We have an analogous form of treatment with different kinds of metals that have been acted on by the Roentgen rays. The difference is that, heretofore, low vacuum tubes have been used, which gave out a different form of radiant energy from that of the gamma-rays. As to radiodermatitis produced by the filtered or the unfiltered rays, there is no difference between them except in degree, depending on the dosage.

DR. RICHARD L. SUTTON, Kansas City, Mo.: I disagree with Dr. Schamberg concerning the character of radium burns. Recently I had under my care a case of cancer *en cuirasse* which had been treated with radium. While the patient was little if at all benefited she was severely burned at a dozen or more points where the agent had been applied. The lesions healed slowly, and were very painful. Despite treatment, several of the burns were still present when the patient died, four months after her return from the sanatorium.

DR. FRANK E. SIMPSON, Chicago: I believe there is no question among physicists that the Roentgen rays and radium rays have certain differences: that the latter contain certain rays that have no analogue in the Roentgen rays. I do not agree at all with Drs. Pusey and MacKee that they both produce the same reaction or result on the skin. The fact that they are all forms of radiant energy does not imply that they are identical. I think there are certain things that can be done with radium that cannot be or at least have not been duplicated with the Roentgen ray. I have seen many cases of angioma successfully treated with radium that could not be duplicated with the Roentgen ray. As to lupus erythematosus, especially in lesions about the nose or eyes, I do not think such patients can be well treated with the Roentgen rays, lest we set up a severe reaction, while with radium I do not hesitate. In this disease radium is really worth while. Certain types of epithelioma I believe can be treated just as well with the Roentgen ray as with radium but there are other cases that do not yield to Roentgen rays. One of my friends, one of the best roentgenologists in Chicago, brought me a case which had absolutely failed to yield to the Roentgen rays, and it yielded very promptly to radium. This is a common experience with others who have used both agents. This may be partially a matter of technic. The form of induced radio-activity described by Dr. Duane, I think would prove very valuable in certain types of epithelioma, but it would be of less value in other dermatologic conditions, such as angioma, the treatment of which requires a certain amount of skilful cosmetic work.

RADIUM AND THE ROENTGEN RAYS IN RADIOTHERAPY

THEIR USES AND LIMITATIONS *

WILLIAM S. NEWCOMET, M.D.
PHILADELPHIA

Rays generated from a Crookes tube may be considered as being identical with those eliminated from radium, varying somewhat, however, in regard to force; therefore before consideration of their therapeutic value, a comparison between them in regard to a few of the more important points dependent on their physical nature might be of interest, it being assumed that the general properties of these elements and the ordinary Roentgen apparatus are too well known to be rehearsed in this article.

The cathode- and the beta-ray seem to be analogous; the two have the same properties except in regard to speed. While the cathode-ray travels 5,000 miles a second, either from or impinging on the surface of the anode, causing the formation of Roentgen rays, the beta-ray is disrupted or exploded from the atom of one of these radio-active salts and leaves it at a rate of from 45,000 to 100,000 miles a second, generating during this disturbance the gamma-ray.

It is obvious that when we have a force of 5,000 miles a second on one side with another of from 45,000 to 100,000 on the other, the result must necessarily differ. A comparison of this with a large number of bullets being projected from or impinging on a surface, in one instance the force being from nine to twenty times greater than the other, gives us an analogy. It follows, as might be expected, that the gamma-ray has far greater penetrating powers than any Roentgen ray so far known, and while it may be possible to build a Roentgen tube that will give the required speed

* Read before the Section on Pharmacology and Therapeutics at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

to the cathode particle, as yet, with our present knowledge of physics, it has not been produced and there is no likelihood of its being accomplished.

Physiologically, the difference between low and high radiation is of the greatest importance; while the low rays are always most active, they lack penetration, and it is well known that the so-called burn is likely to follow their indiscriminate use. Therefore, on account of their activity and lack of penetration they are not so desirable as the higher rays, which possess penetration and are by no means so active in producing tissue change. This point may seem somewhat contradictory, but on analysis it will be found that experience and theory support each other. Let it be taken for granted that as these active low rays pass through tissue, a cell, here and there, feels the full force of the radiation while others are protected. This gives rise to a process in which may be found conditions varying from stimulation on the one hand to necrosis on the other; whereas, under the influence of the high radiation, the effects are more uniform, each cell receiving an equal amount of radiation. If this be true macroscopically, then why not apply the same microscopically? For instance, the important part of the cell is its nucleus, and therefore, if the radiation is obstructed by the cell elements, the nucleus, being protected by them, naturally escapes; this causes an inflammatory reaction, but it is doubtful if it results in the death of the cell. On the other hand, if the radiation is high, all parts of the cell receive about the same amount of radiation and this causes an equal amount of degeneration in all parts and consequent death of the nucleus. Therefore, on this theory the high rays should prove most desirable as a therapeutic agent.

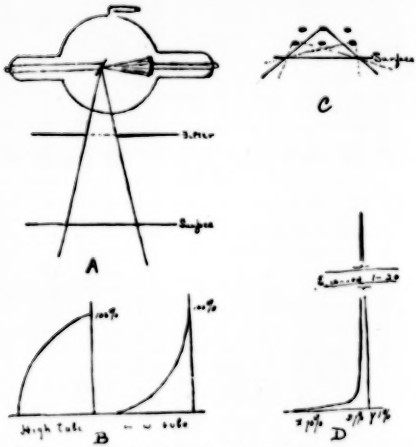


Fig. 1.—Diagram: *A*, showing the relation of radiation to the surface and the penetration of equal proportions; compare with *C*, filter surrounding the radio-active elements and a frequent change of base possible. *B* and *D*, comparative curves showing penetration of the different rays.

A second difference between the Roentgen radiation and that of these radio-active elements is that there is not the least doubt that with the gamma-ray is carried a fairly large proportion of high beta-rays, which, although thought to be useless, have from an experimental point of view a pronounced physiologic significance, and it may be possible that as these gamma-rays are projected through the tissues, the formation of secondary beta-rays may cause the more active change in tissues so commonly seen in reactions from radium.

This may, however, be due to another condition, which is possibly secondary but plays a distinct rôle in the issue between Roentgen and natural radiation; when the former is employed, the point of origin of the rays is usually from 10 to 20 inches from the body, and in this bundle of rays is a wide variation of one variety, a high tube containing a predominance of high rays, while in a low tube the opposite condition prevails. This, however, suffers modification between limits.

From radium spring three distinct forms of radiation: the first may be discarded, as it lacks penetration and would prove useful only when the naked salt was employed; unfortunately, by its exclusion, about 90 per cent. of energy is lost. The gamma radiation, which is supposed to be the important form, from a medical point of view, equals only about 1 per cent. There is not, however, the least doubt that when the medium beta-rays are employed it is possible to obtain about 7 per cent. efficiency of the whole mass, although it is on this point that there exists the greatest conflict of opinion concerning the two forms of radiation. The difference between radium, thorium and actinium in regard to the proportion of the different rays depends largely on the elements that go to make up the individual group; but it must be conceded that the gamma-ray of thorium possesses greater penetration than that of the other two groups. Necessarily this is also true of the beta- and alpha-ray. While some authorities assert that this is a distinct advantage, sufficient proof has not been given for its adoption as absolute.

The mode of application of these radio-active elements differs from that of the Roentgen rays; for instance, the radio-active salt is usually applied to the affected part in close proximity to the disease; therefore, we have a given amount of high-penetrating rays springing from a point near to, and not at a distance, as is usual in Roentgen radiation. This point is of more material interest if several sittings are given, for should there be any tissue between the diseased portion and the radio-active salt, it is not likely to receive the activity at more than one sitting.

Therefore, from a physical point of view, the following differences are observed between Roentgen radiation and the radiation from these elements:

First, the rays differ in penetration.

Second, it is possible the high beta-rays also play a very active rôle, and consequently differ in quality.

Third, the relation of the radiation to the surface and the several planes of tissue is materially altered.

Another point which has been brought out in Bayet's publication is that the dosage of these radio-active elements can be measured with an exactness that is absolutely impossible in Roentgen radiation, and while this is true to a great extent, the variation in the amount of radiation from a Crookes tube is not of sufficient importance to cause it to be made an issue; furthermore, the idiosyncrasies that exist to both forms of radiation cause more anxiety and are more important than the slight variation in dosage.

From the physical difference which has just been cited as existing between these two forms of radia-

tion, it would be expected that the effect on tissue would also be materially altered; and this view is further substantiated by observation. It might be said that the reaction produced by these radio-active salts is decidedly more intense, is usually confined to a limited area and is in turn followed by a fairly rapid restoration of the part; the same degree of reaction produced by the Roentgen ray would be more widespread, the damage to the tissue in the affected part

Fig. 2.—Epithelioma of the buccal surface of the mouth; extensive involvement, perforating the cheek at the site of the present dimple. Result obtained from 11 mg. specimen radium (records of the American Oncologic Hospital). (A similar case relieved by applications of 1 mg. Referred by Dr. J. B. Deaver.)

more uniform, and healing extremely slow. Even the reaction of a chronic character caused by these radio-active elements, as observed in the laboratory worker, will rapidly disappear if the process has not been allowed to progress too far, while the same amount of damage done by the Roentgen ray would produce results that would possibly last a lifetime.

It can be easily seen that under these conditions it is possible to use the radio-active elements and do less harm to surrounding structures than by the other form of radiation, and attention has been called to the fact that very few poor results have been seen from radium. This is thought by some authorities to be due to the care taken in making these applications; possibly this assertion may be correct, for the warning was given by its predecessor, and very few care to witness the burns which were contracted in the early days of the Roentgen ray. Too much credit, however, must not be given to those applying radium, for those differences of a physical nature which exist and seem to be material in this issue cannot be overlooked.

Curiously, however, the varying susceptibility to these radio-active elements seems to be in greater proportion than to the Roentgen radiation. Many observers have called attention to the severe reaction that is frequently seen; it is most alarming when it occurs, and is very likely to cause considerable anxiety; in the person of good physique it is not likely to result seriously, but in the weak and debilitated it may lead to serious consequences; the intense, rapid inflammation may lead to an extensive cellulitis, with its train of concurring symptoms, and usually follows the course natural to that condition, quite in contrast to the inflammatory reaction that follows the application of the Roentgen ray. On the other hand, cases are often seen in which it appears to be quite impossible to produce the expected reaction, and the tolerance almost borders on an immunity.

Therefore the difference between the reaction caused by these two forms of radiation may be stated as follows:

1. Exact dosage is possible with these radio-active elements.
2. The personal idiosyncrasies are far greater.
3. The reaction is more localized and more intense.
4. Resolution occurs earlier.
5. There is less damage done to surrounding tissues.
6. That Roentgen burns have been treated and healed by radium is sufficient to prove its wide variation.

While the difference between these two forms of radiation is being compared, attention must be called to those reports in medical literature in which these radio-active elements have been employed successfully in the treatment of cases after the Roentgen rays had failed; yet at the same time a few have been reported under the reversed conditions. These reports, however, have usually been made by those interested in one form of radiation alone, and therefore must be considered accordingly; but to substantiate the idea that there is a difference in effect on the tissue elements there is a third series of cases reported by those who have employed both forms of radiation for some of these troublesome cases. It would seem that it should and would be far better to employ the two forms of radiation, thereby obtaining the desired reaction from each. Under certain conditions the ease of application to the surface necessarily elects the employment of one of these radio-active elements; as such may be cited when cancer exists in cavities, as, for instance, in the mouth, rectum or vagina.

In cancer of the uterus, radium seems to possess a control that is not observed from any other form of treatment, and while it is rarely permanent it gives

Fig. 3.—E. S. Epithelioma of palate perforating the nasal cavities. Notice the damage. Healed by applications of 4 mg. radium element. (From records of American Oncologic Hospital.) Referred by Dr. H. R. Wharton.

comfort to the patient and materially alters the course of the disease.

These elements can be applied in cavities in which it is impossible to bring the radiation from the Roentgen tube without penetrating the intervening tissue, and it is in this field that the results from these elements seem to be somewhat better than those from the Roentgen ray. Such conditions as polypi within the larynx can be treated without the injury that

leaves the imprint of previous treatment on the overlying skin. In some instances carcinoma of the palate and others of the buccal mucous membrane have been healed. It must not be understood, however, that these radio-active elements are a panacea for cancer; they are far from it; but individual results are often seen that are most gratifying and excite our enthusiasm, though this is not the rule. Here, again, many by their interest in these radio-active elements have in

Fig. 4.—Rodent ulcer of ala of nose; ulceration; was treated during the spring of 1909 by 1 mg. of radium element and remained healed until 1913 when it was again healed by applications from a specimen containing 11 mg. radium element. (From records of American Oncologic Hospital.) Referred by Dr. A. Hewson.

their haste forgotten to look back on the number of patients "cured" by the Roentgen rays. (The word "cured" can certainly be used in its fullest meaning; objection, however, should be made to its employment as a general rule.)

To prove these instances it might be well to recall a few cases that have come under observation and treatment.

Case 1 (Case of Dr. H. R. Wharton's).—A man, aged about 60, who suffered from an inoperable carcinoma of the cecum, was treated with the Roentgen rays. Four years have elapsed with no recurrence and he is still in good health.

Case 2 (Case referred by Dr. Chandler).—A woman, aged about 40, suffering from an inoperable carcinoma of the pylorus, irregular in shape and about the size of two fists, was treated. Seven years have elapsed and she is still in good health.

Case 3.—A patient with recurrent carcinoma of the breast, referred by Dr. McClary, treated seven years ago, is still in good health.

Case 4 (Reported by Dr. Shoemaker).—A woman, with an inoperable sarcoma of the pelvis, with extensive involvement, and about the size of a seven months' pregnant uterus, was treated about ten years ago; the whole mass disappeared and pregnancy resulted twice afterward; when last heard from she was living in the West and was in good health.

Certainly the superficial epithelioma is in most instances promptly relieved by both forms of radiation, but here radium has so many rivals that its only recommendation is the popularity of its cost. The cosmetic results are exceptionally good, and possibly in those cases in which the Roentgen rays have failed, radium often promotes the desired result. In many reports the term "rodent ulcer" is used to signify all small epitheliomas occurring on the face; this is unfortunate, as the usual form is the proliferative fungoid type, which is far from being so malignant. The true rodent ulcer with its undercut edges, which has penetrated below the superficial tissues, is rarely cured by any form of treatment. Epitheliomas or recurrent epitheliomas appearing on scar tissue of low vitality are also as a rule unfavorable cases for either form of radiation.

In deep cancer the choice between massive doses of deep radiation and the employment of these radio-active elements must be considered an open question. Its employment in new growths as sarcoma and fibroma is a matter of individual opinion, and results have been reported from advocates of both; the only possible advantage of these radio-active elements is the ease of manipulation. But it should be remembered that the failure of one form of radiation is no criterion of the other.

There is one field, however, in which these radio-active elements displace the Roentgen rays: that is, in the treatment of nevi, either the simple port-wine stain and the deeply pigmented mole, or those with slight vascularity to those of the deep cavernous variety. While these lesions have been treated by the Roentgen rays, the method is extremely dangerous and the results are usually poor. On account of the vascularity, the character of the burns sometimes produced will cause ulcerations that last for years, and when healed give rise to scars with more or less telangiectasis that are as a rule more unsightly than the preexisting nevus.

The amount and quality of the radiation from these radio-active elements are, at present, still an issue to be decided, although some authors have given support to the prevailing idea that beneficial results depend largely on the amount of radio-active element. This, however, is not the fact, and several instances have come under observation in which very small amounts of radium, used merely as a placebo, completely healed one epithelioma perforating the palate between the

Fig. 5.—Sarcoma of orbit, recurrent, treated by 11 mg. radium element. Growth caused a bulging of the temple about the size of a small split apple. Referred by Dr. Swenck. (Records of American Oncologic Hospital.)

nasal and buccal cavity, and another between the buccal cavity and the cheek. The first case was referred by Dr. H. R. Wharton and the second by Dr. J. B. Deaver. They were both inoperable. These results are frequently seen in all fields of radiology, and one should never despair until the individual case has been given the benefit of the doubt.

The comparison of dosage between these two forms of radiation is an impossibility; the existing difference

in their physical nature, their physiologic action and the mode of application does not permit it. The wide difference of opinion existing between individuals using the same form of radiation makes it difficult to analyze the results, which in all events depend largely on the manner and skill of employment rather than the quality and quantity of apparatus. Therefore at present dosage in all fields of radiation is a variable quantity that must depend entirely on the opinion of the operator.

From this short analysis of the two forms of radiation we may conclude that:

1. Both forms of radiation have wide ranges of usefulness that differ materially under certain conditions of disease, individual idiosyncrasy and adaptability of usefulness to the affected part.

2. There is, however, a wide middle ground in which the two forms of radiation overlap, their employment being a matter of convenience.

3. The use of both forms of radiation will in some instances yield results, when one alone would fail.

Therefore, those employing these radio-active elements should have a knowledge of Roentgen radiation. Experience is also necessary with either form to obtain results, and, furthermore, to guard against untoward effects that are so commonly seen.

3501 Baring Street.

THE PLACE OF THE ROENTGEN RAY IN THERAPEUTICS *

GEORGE C. JOHNSTON, M.D.

PITTSBURGH

The purpose of this paper is to present in abstract form certain information concerning Roentgen therapy with the essentials of which physicians in general should be quite familiar. That this is not the case, however, is proved by the questions so frequently propounded to the roentgenologist by his professional brethren, which questions display frequently a profound ignorance both of what may be obtained in the way of results by this method of treatment and the reason why such results may be expected to follow treatment. The deleterious effects of radiation on tissue (thanks to the unfortunate series of accidents occurring in the early history of the use of this agent for diagnostic purposes) are perfectly familiar to the profession; in fact, it was the occurrence of so-called Roentgen-ray burns following exposure for diagnostic purposes that first suggested that an agent capable of such destructive influences on healthy tissue might be possessed of considerable power as an alterative agent on pathologic tissue.

Beginning with the use of the ray as a depilatory and as a stimulant in the hands of the dermatologist in chronic acne, eczema, etc., experience soon taught that profound effects could be produced on superficial lesions. This was followed by experiments in the treatment of goiter, lymphatic leukemia and tuberculous glands as well as the superficial forms of malignancy, until within the last few years a new field has been opened by the employment of heavy doses with decided filtration in the treatment of gynecologic lesions deep in the pelvis.

It is thus seen that a wide range of activity has been shown to be possessed by this agent, and it is small wonder that many physicians are unable to understand how a radiation can so profoundly influence such widely different structures in such varied situations. Therefore a word of explanation of some elementary principles of Roentgen therapy: The Roentgen ray manifests its physiologic action only on those tissues in which it is absorbed. The most striking illustration of this is shown by Pfahler, who in treating a sarcoma of the neck with deeply penetrating rays produced a dermatitis on the opposite side of the neck. It is therefore necessary in attempting to effect tissue changes of a beneficial character in pathologic tissue to employ tubes capable of emitting a radiation having sufficient penetration to reach down to the lowest portions of the affected tissue. In general, this is accomplished by a variation in the vacuum of the tube, the high-vacuum tube emitting high radiation, the low-vacuum radiations of slight penetration. By means of the unique tube invented by Dr. Coolidge, it is possible to handle the tube and apparatus so as to cause emission of large quantities of radiation having a uniform and predetermined penetration; but with all the usual forms of Roentgen tube, a variety of radiations are emitted not in uniform proportion to each other. A high-vacuum tube, for example, will emit rays of high penetration and in addition a variable quantity of rays of much lower penetration depending on the age of the tube and the amount of seasoning to which it has been subjected.

It is possible to handle a tube so as to produce a peculiar condition of stability of vacuum, constituting what is known as a seasoned tube, in which the proportion of rays of high penetration will be quite great and the proportion of rays of lesser penetration emitted relatively small.

It is further possible by interposing filters of leather or aluminum between the tube and the tissue under treatment, to intercept practically all the soft slightly penetrating rays, thus subjecting the tissue to a bombardment of rays consisting almost entirely of those of a predetermined and desired penetration.

The deeper the lesion to be attacked lies beneath the surface, the greater the penetration of the rays necessary to affect it, while the more superficial the lesion, the less the penetration of rays desired. This is highly important, as for example in the treatment of a patch of lupus situated on the forehead, if the operator should use tubes of high penetration, he would probably succeed in producing some results on the lupus due to the rays of lesser penetration emitted by the tube, but prolonged treatment would be necessary, since the majority of rays emitted would pass completely through the lesion and be intercepted in the bone of the skull and the end-result would be a periostitis, necrosis and exfoliation of the bone underlying the lesion. I have seen this produced in several cases in which the enthusiasm of the physician possessed of a piece of new apparatus was greater than his experience in its use.

In the treatment of superficial lesions, tubes of very low penetration without the intervention of filters are required. A few applications of the radiation from such tubes is sufficient to provoke in the skin a violent reaction, which is followed frequently by the disappearance of the lesion and its replacement by healthy scar tissue. Under such circumstances, a large

* Read before the Section on Pharmacology and Therapeutics at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

majority of the radiation emitted from the tube is absorbed in the tissue involved by the disease, and the action of this radiation when it is absorbed on diseased tissue is a profound one. This is not the time or place to produce a voluminous condensation of the literature on this subject, interesting as it might be to discuss the histologic changes manifested in tissue that has been exposed; but the whole thing can be summed up in a few words which are sufficiently accurate for our purpose and which may explain why such a treatment is followed by results either good or bad.

Normal human tissues in health are possessed of a certain degree of vitality. They react to various stimuli, electrical, chemical or mechanical, in a uniform degree. Healthy tissue possesses a certain degree of physiologic resistance to irritating or destructive stimuli. It is also possessed of certain well-marked reparative powers when injured.

Diseased tissue, on the contrary, is in an entirely different condition. If malignancy, for example, be present, the tissue is composed of rapidly growing cells with changed structural relations, blood-supply of hasty construction, and tissues showing physiologic variations multiplying rapidly with small powers of resistance and slight reparative power. If such tissue be subjected to quantities of radiation correctly prescribed and administered, it will undergo tissue death either slowly or *en masse* according to the degree of rapidity with which the dose has been administered. Small doses of radiation, or radiation of so high a penetration that but little is absorbed, may on the contrary only stimulate and irritate such a lesion, and instead of producing beneficial results is prone to be followed by exacerbation of the growth. Relatively enormous doses are sometimes necessary, and the physician who desires to employ radiotherapy should have the ability to recognize the necessity of such doses and the necessary skill and apparatus for the prompt administration of them when required. In one case which I shall show in which the result was very satisfactory, it was necessary to administer on several occasions 800 times the customary dose at a single sitting, since the ordinary dose merely stimulated the disease. The treatment of skin carcinoma and epithelioma has undergone a decided change in the last few years. The aim of the successful roentgenotherapist at present is to produce a curative reaction as promptly as possible. He no longer hesitates with tentative doses but boldly proceeds to administer promptly quantities of radiation carefully predetermined that are followed by prompt results.

We frequently see cases of epithelioma about the face near the eyes that have been treated for periods of months by men of slight experience whose timidity has compelled them to attempt small doses perhaps daily instead of a few real treatments. The result is usually a chronic ulceration in a markedly atrophic area, sluggish and almost impossible to treat by any other means than excision. These are the cases in which "the x-rays have been found unsuccessful," but the failure in obtaining results is not to be wondered at. It would, however, be remarkable if favorable results were obtained under such circumstances. The treatment of superficial lesions, therefore, has been accomplished by the rapid administration of a sufficient quantity and quality of radiations to produce a reaction sufficiently intense to be followed by the ordinary healing process, and that this is possible in the hands of any man who is willing to devote sufficient time to become familiar with the necessary technic should not meet discussion or doubt. The results obtained in superficial malignancy, lupus, rodent ulcer, etc., are not excelled by those obtained by radium or any other means of treatment.

In the treatment of deep-seated conditions an entirely different technic is necessary. In the treatment of inoperable or recurrent malignancy, a certain amount of inhibition of the growth, sometimes quite marked, may be expected to follow rational treatment. Rays of penetration sufficient to reach to the uttermost borders of the growth must be employed, tubes giving a large proportion of highly penetrating rays are necessary, and filtration sufficient to absorb all rays of slight penetration is imperative. If the sole-leather filters of Pfahler are employed in conjunction with one or more millimeters of aluminum, large quantities of radiation may be applied with but little deleterious effect on the skin if the tubes are placed at a distance of 8 or 10 inches from the surface. Under such circumstances, large masses of tuberculous glands have been rapidly resolved at the hands of many reporters, interesting results may be obtained in cases of Hodgkin's disease and various forms of leukemia, and pituitary struma may be inhibited to a marked degree. Mediastinal involvement in malignancy has been controlled in my hands as well as in the hands of many other men for periods of one or more years.

The value of postoperative radiation as a measure of insurance against the recurrence of malignancy following operative procedure is a question that is still under discussion; I am convinced that it possesses decided value, although such a statement undoubtedly does not admit of positive proof.

The so-called deep therapy of gynecologic lesions is attracting marked attention abroad. In these conditions in which the induction of an artificial menopause is desired and contra-indications to surgical procedure exist, treatment with highly penetrating radiations through selected portals of entry with measured doses is capable of producing cessation of hemorrhage and even of ovarian function. Such treatment demands the highest degree of roentgenologic skill and technic since the doses necessary are so large as to be capable of the most destructive effects on the skin. Attempts at this technic by those who are unqualified will be certainly followed by such a series of disastrous results as to cast discredit on the whole subject of Roentgen therapy.

The Coolidge tube, an American invention, the product of the genius of Professor Coolidge of the General Electric Company, opens a new field in Roentgen therapy. This tube differs decidedly from the ordinary Roentgen-ray tube. Briefly, the cathode consists of a spiral of tungsten placed about ¼ inch from a heavy tungsten target. Both these tungsten elements are mounted in an ordinary Roentgen-ray bulb which is then exhausted by a special series of processes to an almost perfect vacuum. In this condition the tube permits the passage of no electric current, and in order to render it operative it is necessary to heat the tungsten spiral by the passage through it of an electric current of 12 volts from a storage battery. The storage battery, rheostat, ampere-meter and tungsten spiral form an electric circuit. The incandescence of the spiral is controlled by permitting the passage of more

or less current by means of the rheostat. This storage battery circuit is carefully insulated, and on the storage battery circuit there is impressed a potential of from 50,000 to 100,000 volts from a high-tension transformer, whereupon tungsten electrons from the incandescent spiral are hurled across the gap in the vacuum, striking on the tungsten target, and from the points of impact Roentgen-rays are emitted. This tube permits the passage of enormous quantities of current for long periods of time, resulting in the emission of great quantities of Roentgen rays. The penetration of rays depends entirely on the voltage impressed on the tube circuit, and if this be kept constant, the penetration remains constant. There is thus placed in the hands of the roentgenologist an instrument of precision and of extreme power, but it must be remembered that he is dealing with a two-edged sword. It is greatly feared that the introduction of this tube will be followed by a series of grave accidents, both to the roentgenologist employing it and to the patients who may be subjected to its use, unless exceeding care in technic is scrupulously followed. The employment of aluminum filters of at least 3 mm. thickness is advised when this tube is used for deep therapy.

The excitement occasioned by the discovery of large bodies of radium-bearing ores in the United States has been followed by an increase of interest in the use of this element for the emission of radiations of therapeutic value. There is no longer any doubt of the distinct value of radium rays under certain circumstances in the treatment of certain malignant conditions.

In my opinion, the greatest field for radium therapy lies in the treatment of malignant conditions in the otherwise inaccessible portions of the body, carcinoma of the esophagus, of the body of the uterus, of the bladder, of the tonsils and antrum, and in the treatment of giant-cell sarcoma in which it is possible to introduce tubes having a heavy radium content into the body of the growth by surgical means and permit the radium to remain for considerable time. Radium will by no means supplant the Roentgen ray in the treatment of these conditions, but will rather supplement such treatment as the Roentgen ray in its turn so ably supplements scientific surgery to-day. A most interesting corollary is observed in the successful treatment of the malignant keratoses produced on the hands of the roentgenologist by long exposure to the Roentgen ray. In a number of instances which I have observed, fingers which demand amputation on account of multiple malignancies have been saved by the application of radium and are now covered by apparently normal and healthy epithelium. The explanation of this fact is not yet clear.

63
14

SUMMARY

1. The Roentgen ray is of distinct value in the treatment of a number of conditions.

2. It can never supplant, but can and does supplement, surgery to a valuable degree.

3. The results to be expected depend on the employment of a correct technic which implies the ability to prescribe correctly and administer the necessary dosage at the necessary time in each individual case.

4. The Coolidge tube has placed in the hands of the profession an instrument capable of great good if carefully and intelligently employed.

5. The value of radium as a therapeutic agent should be no longer disputed.

6. The physician employing these various agents must be thoroughly familiar with the possibilities of present-day surgery as well as expert in his own technic in order that his patient may obtain the benefit of everything that science has to offer.

7. Physicians and the public must never forget that every case of malignancy remains for a certain length of time after its inception a curable disease by proper surgical procedure.

Jenkins Arcade.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. NEWCOMET AND JOHNSTON

DR. HENRY K. PANCOAST, Philadelphia: A most important difference between Roentgen rays and the "gamma" rays of radium, is in their manner of production. "Gamma" rays are produced at the time of disruption of the atom, and Roentgen rays at the time of impact of the negative corpuscle, hence the greater and more uniform degree or penetration of the "gamma" rays. All roentgenologists realize that we are again in a developmental stage with roentgenotherapy, and that in the next few years much more will be accomplished, especially in deep treatment. This will be brought about mainly by the combined use of the Coolidge tube, cross-fire radiation and adequate filtration. In the treatment of superficial lesions, everyone now employs massive dosage, one or a very few applications being all that is necessary to control the disease. If this principle is applied to deep lesions, and a massive or erythema dose is directed at the site of the growth by cross-fire methods, similar results should be obtained in many cases. One of the most important applications of deep therapy is in the treatment of uterine fibromas. Results may have been such as to substantiate the claim for this as the preferable method of treatment, but I can hardly accede to such a view at present. I still believe that roentgenotherapy should be reserved for selected cases in which radical operations are undesirable, refused or contra-indicated. Much can now be accomplished even in uterine carcinoma. Finally, while roentgenotherapy will never be a panacea for deep-seated cancer, we feel sure that future results will surpass those of the past.

DR. ARTHUR F. HOLDING, New York: The application of radium as we find it is confined to small areas. The tubes are small and can only be applied to small areas and in order to treat large areas the method of emanations in vacuum tubes is possible. This is an important advance in the use of this radium for malignancy. I think there was no mention made of the use of the emanations for constitutional diseases. The results of radium are usually obtained in the treatment of superficial lesions but Van Noorden and others have used it in many other conditions, using the emanations in a closed chamber. Very little work of this kind is done in this country. We must consider both the local and general reactions of radium. So far as we have gone now we use both of these agents in the same class of patients. As we have more experience with these two agents we can use them according to the case. Those who have had the most experience with the Roentgen ray think most of it and the same holds true of radium. The most important thing to recognize is that there are certain classes of cases that can be adequately handled by any one of these agents: it is not the question whether one is better than the other. You can get a better cosmetic result without opening lymphatics, etc., by these physical methods. The Roentgen rays were discovered in 1895 and we are just beginning to think we know a little about this agent. We do not know as much about radium and in order to find out we must cooperate with the physicist. At present radium is difficult to obtain. The Roentgen ray and desiccation do very well in the same class of cases as the radium. Care must be used in selection of cases for treatment with radium or the Roentgen ray. The

Roentgen ray has a great deal of power for superficial healing and therefore care must be taken in its use. Sometimes there is marked healing and everything pathologic that is visible disappears under the radium, but the patients develop marked cachexia. There is danger in attempting too much.

DR. WILLIAM DUANE, Boston: It has been discovered that the Roentgen ray from a tube really consists of two different kinds of ray. The penetration of one kind depends on the voltage, and the penetration of the other depends on the substance used as an anticathode. Roentgen rays have been found to be similar to the ultraviolet light, although for seventeen years it was thought that they were quite different from ordinary light. It has recently been discovered that Roentgen rays are light waves of exceedingly short wavelength. The shorter the wave the more penetrating it is. It has been shown that the wave-length of the Roentgen ray depends on the nature of the anticathode in the tube. I want to emphasize the fact that the rays from the tubes are of two kinds, one depending on the voltage and the other on the nature of the anticathode.

DR. A. L. GRAY, Richmond, Va.: I have had no experience with radium except some years ago in treating one or two tumors on which I was using a very small amount and of low radio-activity. I obtained no results with the specimens I used. I have now been actively engaged in Roentgen therapy for some twelve years, and my results are as good as if not better than at first and my enthusiasm has never waned in the slightest. I have not been employing deep therapy except in the treatment of tuberculous adenitis. My results have been almost uniformly good in these cases by the fractional method of treatment. I am now using massive dosage, and have been for a short time, but I can not yet definitely report results. Those who have been for some time employing the massive-dose method report that they are experiencing better results from it than they formerly did by fractional dosage. It is more satisfactory to the patient as well as to the operator, and the end-results, so far as I know, are equally as good as if not decidedly better than by the fractional method.

DR. JAMES W. HUNTER, Norfolk, W. Va.: Has anyone had any experience in deep therapy with the Coolidge tube and if so, does he employ filters? I have tried some work on deep therapy with excellent results but I do not encourage it very much. I should also like to ask about the use of filters of thin sheet lead used in the same manner that radium is employed.

DR. GEORGE E. PFAHLER, Philadelphia: I have been interested in the deep therapy and have been using the Coolidge tube a great deal and am enthusiastic in its use and results. It is exact and capable of delivering anything we wish. We can give enormous doses in a short time and it enables us to multiply our fields of entrance so as to give a single dose through any part of the skin and yet multiply the deep effect as many times as we wish according to the time and energy we wish to put on the patient. We have to-day an agent that is, I would estimate, one hundred times more valuable in the treatment of deep-seated diseases than we had at hand a year ago. We cannot report wonderful cures at present, as a sufficient time has not yet elapsed. We have the right to expect results we have not heard of before. We cannot cure all cancers no matter what we do, but I believe we can increase our end-results very much within the coming year. I refer to one case as an illustration of what can be accomplished by the newer technic. Dr. Barton Cook Hirst operated on a woman in May, 1913, and found the entire viscera matted together by carcinoma. The abdomen was closed and the patient developed progressive symptoms of obstruction of the bowel and intense pain requiring morphin. The family physician sent the patient to the dispensary under my care with a note asking me to give her treatment, for a mental effect, and possibly for the relief of pain. I said I was willing to try what could be accomplished and I therefore at once divided the abdomen into thirty-five areas and sent through thirty-five full doses (that is, all the skin could stand). Therefore, the deep part of that disease got thirty-five times as much as we could have given this patient a few years ago. I should add that I repeated this dosage in two weeks and in several areas got rather a severe burn of the skin. I believe we should never repeat it in two weeks and probably not in less than three. This treatment begun in December. I sent her back for examination a week or ten days ago and the only evidence of the former disease was a little resistance in the left iliac region; all the rest is soft and the patient is enjoying good health. This is thirteen months after she was given up as hopeless. This will serve as an example of what we probably can hope for in the future and which we could not do in the past.

DR. G. B. MASSEY, Philadelphia: Probably the most useful result of Dr. Johnston's showing and of Dr. Pfahler's case is to offset rather a bad impression prevalent in the medical profession as to the inefficacy of the Roentgen ray in cancer. I hear a great deal of discouraging talk about it. It is my belief that the cause of a great deal of this is the inefficiency of the operator. The Roentgen ray is used too carelessly. It is used by men who do not look after their work properly, delegating it to nurses, and by those who do not know what they are doing themselves. It is also true, as Dr. Pancoast says, that each of us has his own method, in which he is most efficient, though there may be several ways to treat some of these cases. While it is very true that the progress of the future will depend largely on the development of personal efficiency in definite methods, an equally important thing is to realize that there should be a selection of methods that are really best in given varieties and stages. It may be that the method we use is not the best in a particular case. To me, for instance, it is absurd to use the Roentgen ray or radium for a small epithelioma of the skin no larger than a pea, and flood the body to an unknown depth with this force, when in ten minutes it could be destroyed by ionization or desiccation. As far as I know the use of the Roentgen method in the mouth has been ineffectual in growths of the mucous membrane; here we have a vast field for the ionization process. We must cultivate the several varieties of the physical forces as they are developed and applied in this work as well as our own efficiency; the best results are by the combination of both.

DR. WILLIAM L. CLARK, Philadelphia: I am convinced that the massive-dose, cross-fire method of applying the Roentgen rays is more productive of results than the small divided-dose method, especially in the case of malignancy. I believe that the Coolidge tube offers great possibilities on account of greater penetrating power and refinement of control. It has been declared that on account of shorter wave-lengths, the gamma rays of radium may be approximated or even duplicated. If this is true, the whole range of Roentgen ray and radium effects could be produced at will, and the whole subject revolutionized. Since the "desiccation method" has been mentioned several times in the discussions I may briefly allude to it. I have depended on desiccation entirely in the superficial epitheliomas, but in more advanced cases the efficiency is increased by employing the Roentgen rays in conjunction. I have found that as much can be immediately accomplished by one desiccation application as can be accomplished by the Roentgen rays in a comparatively long period of time, but in combination the efficiency of both is increased, doubtless due to the action of the Roentgen rays on pathologic tissue deeper than can be reached by desiccation.

DR. GEORGE C. JOHNSTON, Pittsburgh: I do not claim that the Roentgen ray is the cure for cancer. Every case of malignancy in its inception and for a certain length of time following is a curable disease by surgical procedure if it is possible to remove the disease completely. Every man who practices roentgenotherapy should associate himself freely with a competent surgeon so that he may know what surgery can do and hence will not deprive his patients of proper surgical procedure. When surgery does not prove successful or in certain locations such as the eyelids, for example, when better results may be obtained by radium or Roentgen ray, we are justified in using these agents. There is no difficulty in obtaining radium if one will pay the price for it. Nine-

V. 191

tenths of the radium reports mean nothing because they do not specify the amount of radium element employed. In this country, at present, a great many men are working with tubes containing what they believe to be radium and for which they have paid a radium price but which really contain little, if any, radium element. I believe that radium has a distinct use, especially in locations which are inaccessible to the Roentgen ray, and there is no doubt in my mind that excellent results can be obtained if proper quantities of radium element are intelligently employed. Radium is a necessity in the treatment of chronic Roentgen dermatitis seen on the hands of roentgenologists. There is no other agent that will produce the results obtained by radium in the treatment of these conditions. The Coolidge tube contains no positive ions. If a Coolidge tube fluoresces green, it is not properly pumped and is not a Coolidge tube at all.

DR. WILLIAM S. NEWCOMET, Philadelphia: I am not interested in the superficial conditions such as epithelioma of the skin because they can be effectively treated by many other methods. While many good results are observed in these deep malignant diseases, these radio-active elements must not be regarded as a "cure all." Formerly 1 mg. of radium salt might be spoken of as having 1,800,000 activity, and another specimen as having 600,000 activity, while the weaker specimen might contain more radium and would actually be a better specimen, as the methods of measurement were very crude. It makes very little difference whether you have 10 or 20 mg. in a given specimen containing the same amount of radium, as the high beta and gamma radiation easily penetrates the debris, and the filtration used is often 3 mm. of lead, which far exceeds the natural filtration under these circumstances. No doubt many of these persons who were supposed to have been deceived a number of years ago, bought the supposed radium at the actual strength, but it contained a mass of thorium products which degenerate rapidly, and made these specimens in a couple of years decidedly weaker. The dealers must not be censured for it, however, as it was a matter of ignorance and not deceit. One condition in which radium far supersedes the Roentgen ray in that of nevi. By means of radium and without leaving a scar I removed a large cavernous nevus from a child who in addition had a greatly enlarged nose. I do not believe this could have been accomplished by the Roentgen ray or by acupuncture of the days gone by. My enthusiasm over radium is partly due to the conditions which yield to it when the Roentgen ray fails. With relation to the position of the Roentgen ray I think that some cases are more easily handled by surgery and the results are better; but in conditions allied to superficial skin epithelioma of slow type the Roentgen ray is to be preferred for the cosmetic result; no tissues are injured and after the lesion is once healed it usually remains permanently healed.

EPITHELIOMA OF THE LIDS*

CARL FISHER, M.D.
ROCHESTER, MINN.

Epitheliomas of the lids require some consideration apart from epitheliomas of the skin elsewhere, because of their proximity to the orbit and sinuses and because of the disastrous effects of destruction of the lids on vision and on the appearance of the patient. A good proportion of these patients do not consult the ophthalmologist but are sent to the general surgeon after a long course of salves, pastes and Roentgen-ray treatment.

I have been able to study eighty-eight cases of epithelioma primary in the lids and canthi, or involving them from the skin in the immediate vicinity (nose, cheek, brow), having chiefly in mind the prognosis of operative treatment. The statistical data were collected to serve as a basis of comparison with other methods of treatment, especially radium. It should be added that the diagnosis in all cases was confirmed by microscopic examination.

The epitheliomas of the lid all belonged to the type known as basal-celled, or, to use a rather popular term, rodent ulcer. By this is commonly meant clinically a cancer of the skin of very slow growth, with no tendency to glandular metastases, spreading by continuity, and usually ulcerating as it progresses. Pathologically, it is somewhat more difficult to define, though this is perhaps of no great consequence to our present object. Adami[1] sums up the present view of this class of epithelioma.

> Krompecher, recognizing that all conditions classified as rodent ulcer do not belong to the type, has labeled this form basal-celled carcinoma, on the mistaken ground that, as it shows no prickle cells nor keratinization, it is derived wholly from the basal, undifferentiated cells of the rete Malpighii. But this is so also for all epitheliomas. In the more highly developed forms the prickle cells present do not arise from pre-existing prickle cells, but also from basal mother cells. It is the stage of undifferentiation and anaplasia—the capacity to develop beyond a certain point—that determines the form of the cells.

After the growth has progressed, both basal and squamous cells are to be found in the field, one or the other predominating. Sometimes the appearance may closely simulate sarcoma from the tendency of the epithelial cells to assume spindle forms. I have seen this mistaken diagnosis made several times in epitheliomas of the orbit (Figs. 1 and 2).

In this series the average age of incidence was 53 years. The youngest patient was 24 years old. The average patient waited five years before coming for treatment; many of them from fifteen to twenty-five years; these latter mostly began as keratoses and small wart-like nodules. Some developed rapidly, that is, in one month.

The favorite points of origin were the lower lid (46 per cent.), the inner canthus, over the lacrimal sac (36 per cent.). The next most common point of origin was the upper lid and, least common, the outer canthus.

Of the cancers of the lid, considerably over half originated in the skin of the lid just away from the cilia, the others starting indifferently on the very margin of the lid or the base. There seems to be no obvious reason why the lids should be so favorable a site for the development of epithelioma. The fact that the lower lid and inner canthus are so much more commonly affected might be attributed to the irritation caused by tears and foreign matter. Certainly these regions are usually hyperemic when the upper lid and outer canthus show comparatively little evidence of irritation. In only one case was the pressure from eye-glasses a probable source of the initial irritation, which is so commonly looked for. The type of skin well recognized as a fertile soil for epithelioma—a dry, rubicund skin, seen most often in blond people exposed to the elements—was very often seen, but by no means predominated.

The majority of these cancers progressed by invasion only, the first step being attachment to the peri-

* Read before the Section on Ophthalmology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

* From the Mayo Clinic.

1. Adami: General Pathology, Philadelphia and New York, 1908, p. 735.

osteum of the orbital border, then progression into the orbit and conjunctiva. In several cases the inner orbital walls were destroyed. Occasionally the antrum was involved, and more often the ethmoids, rendering successful operation very difficult.

In five cases, cervical or parotid glandular involvement was present when the patient was first seen. These two groups of glands drain all of the skin and the conjunctiva, while the orbit drains into the internal maxillary group and thence into the deep cervical. Unsuccessful treatment seems to favor glandular involvement, since, of these five patients, only one had escaped pastes or Roentgen rays previous to examination in our clinic, and about the same proportion was found in epitheliomas of the cheek with glandular involvement. The type of tumor did not differ microscopically in these cases from that in cases not showing glandular involvement, so that the failure to involve glands is not a necessary characteristic of rodent ulcer. Our pathologic records, however, do not indicate the character of the metastatic growth. None of the patients developed enlarged glands after coming under our observation, which may have been due to the methods of treatment employed.

Fig. 1.—Epithelial down-growth showing spindle and oval cells which, when in masses, often look like sarcoma cells.

These patients were treated chiefly in three ways — radical excision, excision with actual cautery of the wound, or simply actual cautery, the method employed depending on the site of the growth and the degree to which it had progressed. Purely cutaneous growths, if small, were cauterized. Growths involving the border of the lid, but not adherent to the periosteum, were excised and a plastic operation done to restore the lid. Where the growth was adherent to periosteum or had involved conjunctiva and orbit, or tear-sac, actual cautery was added to excision. In cases of orbital involvement not readily accessible, an exenteration of the orbit, including the periosteum, was performed and the contents of the apex cauterized. For cauterizing large areas, the soldering iron was found preferable on account of the deep cooking given the tissues — a principle used in Percy's treatment of cancers. Involved sinuses were opened, curetted and cauterized in so far as possible.

The plastic repair of the lower lid is a frequent problem. Many satisfactory results were obtained from the transplantation of a "hammock" flap of skin from the upper lid, a method devised by C. H. Mayo. This flap is soft, of the same color as the normal lid, and grows readily. The operation recently described by Gibbon[2] promises to be the one of choice when the lower lid has been largely destroyed. No conventional method will serve every case. The repair is easy when a fair amount of the lid has been left. When, however, the entire lid and part of the cheek have been removed, as is often necessary, large flaps from the temple (as noted in the text-books) give the best results. The Dieffenbach and similar procedures, beautiful on paper, have not proved so successful on patients.

RECURRENCES

This has no reference to final cures, but refers to any recurrence whatever taking place after operation in our clinic. Most of these were small nodules, easily burned off. Of the thirty-three epitheliomas involving the lids and canthi alone (adherent or not adherent), 17 per cent. recurred at some time. These recurrences were all at the site of the previous growth, and not in glands. When, however, the growth had penetrated the orbit, the percentage of recurrence rose rapidly — eight out of eleven. Of thirteen cases involving the orbit, primarily and secondarily, three have passed the one-year period without recurrence. Four others have not yet recurred, but have not gone a year since operation. The time-limit of one year is somewhat arbitrary, but is based on the average time before recurrence, namely, nine months. This is a rather high average, being brought up by a few unusual cases which were reported as having recurred very late. The majority of cases which recurred at all did so in three to four months.

The chief interest in these cases for the clinician lies in the ultimate prognosis. I have not counted as cures cases of less than one year's standing since the last operation or treatment. Naturally, the percentage would be considerably higher if cases of over four months' standing were cited and if all patients were willing to return at the first sign of recurrence.

Of the thirty-three epitheliomas of the lids and canthi, not including the orbit, in which the records have been completed by recent news of the patients, 94 per cent. were cured by operation. When the orbit was involved, the percentage was turned about; 80 per cent. were not permanently cured. These include cases in which the sinuses also were involved. The factors which mitigate against cure are: inner canthus involvement, penetration of conjunctiva or lacrimal sac, orbital involvement and sinus involvement. The cases of glandular involvement cannot be classified because our records are not completed, owing to the lack of recent information of these patients. The one "completed" case had no recurrence after a radical local removal, and dissection of the cervical glands.

The comparison of these results with those obtained by the use of radium or Roentgen rays or pastes is difficult because of the absence in most papers on the subject of definite data regarding the duration of the cure. Williams and Ellsworth, however, are not remiss in this regard.[3] Of the nineteen cancers of the skin of the lids, two-year cures are reported in thirteen cases, or 68 per cent. These are evidently not intended to include cases with orbital involvement, since one case of orbital involvement is listed separately. The percentage of two-year cures by operation in our series was 84.

2. Gibbon: Blepharoplasty by a Pregrafted Flap, read before the American Surgical Association, April 9, 1914.
3. Williams and Ellsworth: Treatment of Superficial New Growth by Pure Radium Bromid, The Journal A. M. A., May 31, 1913, p. 1694.

Pinch,[4] in a report of the Radium Institute of London, classified his cases of rodent ulcer into apparently cured, thirty-one; "improved," forty-one; not improved, twelve; abandoned treatment, six. Counting improved, not improved and abandoned as failures (as was done in our series), the percentage of cure is far from satisfactory (about 39 per cent.) and this without any minimum time-limit set. It should be said, however, that these were rodent ulcers of various regions and severities, so that the comparison is not altogether fair. Pinch was able to state on this showing that "rodent ulcer is of all cancers the most amenable to radium treatment." Turner[5] cured six out of nine completed cases of rodent ulcer of various parts of face and lips, or 66 per cent., time not stated. The best opinion at present concerning radium versus operative treatment of these cases is well-summed up by Knox.[6]

"1. In all cases of early cancer, the operative method is undoubtedly best; it is quicker, safer and offers the best prospect of cure. . . . 3. In patients who refuse operation or are otherwise unfit for operation, radium is a useful remedy."

Fig. 2.—The same as Figure 1, except growth is taken from nose.

Comparison of operative treatment with pastes is also difficult. I have found no recent records sufficiently exact to afford a statistical comparison. Perhaps the most revolting, because easily avoidable, pictures of malpractice that one sees are cases of cancer of the skin treated with various pastes, and the inevitable impression received is that the public has suffered unspeakably from the exploitation of the paste treatment. Nevertheless, it must be acknowledged that in the hands of persons practiced in this procedure, many surprising cures are obtained, and these sometimes in apparently inoperable cases. No doubt the continued financial success of certain "cancer institutes" is maintained by a fair number at least of noteworthy cures.

The Roentgen ray is believed to owe what efficiency it possesses to a ray corresponding to the gamma ray of radium, so that there seems to be no reason for preferring it to the latter (save its greater accessibility) since the curative rays are acknowledged to comprise only a small part of the whole Roentgen ray. In point of fact, the Roentgen ray cannot be regarded as a dependable agent in the treatment of epitheliomas, however useful it may be as a palliative or postoperative measure.

The present evidence seems conclusive that operative measures are, in general, the safest means of treatment we possess for epitheliomas of the lids (and for that matter in any other region), and especially when the growth is rapid and adherence to periosteum or involvement of the orbit has taken place or evidently will soon take place. On the other hand, when the patient can be kept under observation until a cure is completed and the growth is proceeding slowly, there seems to be no good reason why radium should not be used. In cases of this kind, however, it has the disadvantage of slowness, and there is also the difficulty, in most places, of obtaining the radium. But many patients prefer any amount of treatment to the use of the knife, a psychological factor that is heavily featured in the advertisements of the clever charlatans. The cosmetic results of successful radium therapy are excellent; I have seen no injury or reports of injury to the eye from its use; it is practically painless. In this as in any therapeutic or surgical measure, the experience and ability of the physician in charge plays an important rôle, especially in pioneer work with comparatively new methods of treatment.

The importance of early and radical operation in epitheliomas with orbital extension is well emphasized in the statistical data given above. Unless the growth is so clearly circumscribed that complete removal without sacrificing the eye is certain, a complete exenteration of the orbit followed by cautery is imperative. Extension to the sinuses renders the prognosis nearly hopeless; in such cases, if operation is decided on, it should be followed by the persistent use of radium or by Roentgen ray if the former is not available. Glandular involvement, without orbital extension, does not necessarily indicate a bad prognosis, granting that a proper resection of the gland-bearing fascia be made.

ABSTRACT OF DISCUSSION

DR. EDWIN E. JACK, Boston: My own experience with epithelioma of the lids, never in any way comparable with Dr. Fisher's, has been smaller in recent years and offers nothing from which statistics of value can be drawn. It has seemed to me that such cases went more and more to the general surgeon or for Roentgen-ray and radium treatment. The public print too has been busy with this, as with other new subjects in medicine, and it is likely that many choose their own method of treatment—and it is not that by the knife. It seems impossible to disagree with Dr. Fisher in any of the statements he has made. If patients with epithelioma involving the sinuses recover under any treatment I do not know of them. Penetration into the orbit, involvement of bone, situation at the inner canthus—all undoubtedly influence the prognosis for the worse. The surgical technic described by Dr. Fisher represents the last word. From the cosmetic point of view, in any advanced case, of course operation leaves much to be desired, for it is often true that space must be filled in as best we can. In the less serious cases, deformity is less, but the results rarely resemble the almost marvelous ones of successful radium therapy. The greatest point of interest in connection with the subject is the relative value of this therapy and of operative treatment. We have all of us undoubtedly seen cases of small epithelioma beautifully cured by the Roentgen ray and radium, and have seen or heard of authentic like results in larger growths, even in some which offered little hope from an operative point of view. We have, in addition to our own experience in this matter, that of surgeons, roentgenoscopists and radiographers

4. Pinch: Brit. Med. Jour., Jan. 25, 1913, p. 149.
5. Turner: Brit. Med. Jour., March 22, 1913, p. 606.
6. Knox: Brit. Med. Jour., June 7, 1913, p. 1196.

to help us, and with this in mind I have been interested in interviewing a number of men working in these different lines. Among surgeons one would expect to find a very decided opinion in favor of operation, seeing, as they must, cases of unsuccessful or inexpert radium and Roentgen-ray treatment, in which the difficulties of operation have been much increased, and the prognosis made poorer thereby. And such is the fact. A few see no good in substituting what they consider an uncertain treatment for the certain method of surgery, even in those growths most amenable to radium treatment. Others favor the latter for the small unattached growths, and the potentially malignant ones. I have been surprised at the conservatism of those who use the Roentgen ray or radium. Dr. Dodd, one of our best workers, will not touch any case with the Roentgen ray, unless already operated on. He feels hopeful, however, that in the future a better knowledge of dosage and the use of new tubes will put the matter of Roentgen-ray treatment on a surer basis, freed from the danger of overstimulation which now attends its use. At the Boston City Hospital, under Drs. Williams and Ellsworth, and at the Huntington Cancer Hospital, under Drs. Ordway and Duane, as a rule, only small and unattached growths are treated primarily with radium, always with a sharp lookout that the growth is not stimulated rather than stunted—a thing which one or two treatments will prove, and always in the cases at the Huntington Cancer Hospital at least, with the cooperation of the oculist or surgeon interested, to share the responsibility of the case. It is the general belief that in the simpler cases, the results are almost uniformly good. As we know, the usual type of growth on the eyelid seems especially amenable to this form of treatment. Radium is applied, too, to inoperable cases, either on account of the condition of the patient, or because of the extent or situation of the growth, as a postoperative measure, and sometimes as a preliminary to operation, to lessen the area to be attacked. It sometimes happens, unfortunately, that the growth becomes active under the low-grade tissue covering after the apparent cure by radium, but the same occurs under the flaps after operation. It is on this account that Dr. R. B. Greenough, at the Huntington Cancer Hospital, has been in the habit of leaving the field of operation open until assured that recurrence is not taking place, before applying the flaps. Recurrences may come after any method of treatment, but in the small, isolated and unattached growths there seems to be reason to believe that the use of radium is as successful as operation. I do not know of any very recent definite statistics bearing on the point. Dr. Williams in a recent interview, however, has told me that he thought that his success in such cases would fully equal the percentage mentioned by Dr. Fisher. He has also said that there were reasons to believe that the recurrences after an apparent radium cure in such cases, might be fewer than after operative treatment, mentioning as one reason, the fact that he had seen cases of several recurrences after operation, apparently permanently healed by radium. One thinks of radium therapy in connection with the eyelids for especial reasons. One, the fact that most of the epitheliomata which occur there are of a mild type, and most amenable to this treatment, and, again, the importance of preserving as far as possible the integrity of the lid for cosmetic and protective purposes. In this way the lure of radium is great. It would seem, then, that if we advise or give the choice of radium in the smaller uncomplicated and unattached growths, in cases which for one cause or another are inoperable, for after-treatment, and in certain cases as preliminary treatment, advising operation to all others, we shall be doing what the best practice of the day suggests. This presupposes that what is done is to be done by experts, and the results carefully watched. There seems to be hope in the future from Roentgen rays, and it is probable that the field for the use of radium will extend.

Dr. Edward Jackson, Denver: Among the few cases that I have referred for Roentgen-ray treatment to competent men, all of the superficial epitheliomas of the lids have been cured for periods extending over a year, and I know of two patients whom I see from time time in whom the cure has been permanent over ten years. The Roentgen ray has probably been more recklessly and more inefficiently used than almost any other therapeutic measure. I believe, however, that for relatively large areas superficially involved, I would prefer the Roentgen ray, of which I know little, or radium, of which I know less, to excision. For others I would agree that excision is to be advised in every case. Circumstances of the case, however, may influence one. If the patient comes from a distance, operation requires but a short absence from home. If the patient lives where applications can be made from time to time, the Roentgen ray or radium need not interfere at all with his occupation. The cosmetic result that can be obtained by radiotherapy is frequently superior to that obtained by operation, even in the most successful hands. One of the last patients I saw had an area perhaps three-fourths or four-fifths inch in diameter extending up nearly to the edge of the lid, covering a large part of the lower lid and extending onto the cheek. I am sure it could not have been effectively excised with any such comestic result as was obtained by Roentgen-ray treatment.

Dr. S. D. Risley, Philadelphia: Excision of epithelioma of the eyelids in my experience has been necessary comparatively rarely and always causes deformity. The procedure I prefer is to scrape away the diseased tissue and cover the denuded area with healthy epithelium from some other portion of the body, preferably from the inner side of the forearm. The technic is important. To apply a thick skin-graft is to invite failure. The graft should include only the superficial living cells and should be applied to the denuded surface directly from the surface of the razor, from which it can be spread over the surface smoothly where it adheres immediately. If the thin graft be placed in chemical solutions, for example, of mercuric chlorid, the epithelial cells are destroyed and cannot be expected to live when applied to the wound. Furthermore it will be found that the edges of the graft roll inward if removed from the razor and placed in any solution. While cutting the graft it is necessary to keep the surface of the razor moist either with sterile water or physiologic salt solution, preferably the latter, otherwise the graft does not spread out on the surface of the razor. A dry protective dressing is all that is required.

Dr. William L. Clark, Philadelphia: During the past six years I have treated forty-nine epitheliomas of the lids and canthi by desiccation surgery, the technic of which I described to another Section of this Association. The percentage of cases free from recurrence compares favorably with those reported by Dr. Fisher. In choosing a method for the treatment of epitheliomas, especially those near the eye, the length of time in which there is freedom from recurrence is not the one important point to be considered, and should not be the deciding factor as to the merit of the method to be employed. After excision of epitheliomas of the lids and canthi, no matter how thoroughly the work appears to have been done, there is a percentage of recurrences. What is to be done in this case? If excision is practiced a second or third time there is usually unsightly deformity, often with exposure of the eyeball, notwithstanding the best plastic work. This is not true of desiccation. Should one or several recurrences appear, desiccation may be employed without the deforming results attendant on excision. The objection to radium and the Roentgen ray as to the time required to produce a result, and the danger to the eyeball, does not apply to the desiccation method. Accessible tissue may be destroyed by one application if desired, and this is always the aim in the case of malignancy, as that is the key note of success. It is a precise method. A pin point surface, as well as a large area may be devitalized to a considerable depth, and there is no contracted cicatricial tissue, as is the case with cauterization or chemical caustics. A thermic effect is produced by means of a specialized high-potential electric current, which devitalizes tissue at a point short of cauterization. The tissue is thereby dehydrated or desiccated. My ideas on this subject are not in accord with those of Dr. Fisher. Experience has led to the conviction that excision is the least desirable method for treating localized epitheliomas. One who has once seen such a growth destroyed by desiccation and observed the results, must be impressed with its merits. Dr. Arthur Holding, representing the Huntington Cancer Commission of

Cornell University, New York City, in a report presented to the Section on Dermatology, classified desiccation surgery as the method of choice for localized epitheliomas. The realm of surgery is a wide one in which desiccation plays only a small part, but in localized epitheliomas and precancerous lesions, such as moles, nevi, etc., especially those of the lids and canthi, there can be but one choice for those who have compared the results of both excision and desiccation.

DR. CARL FISHER, Rochester, Minn.: I wish to reiterate that no one would attempt to insist on any one treatment for lid cancer. There are so many conditions to be considered—the distance the patient lives, his own particular conditions of living, what method the surgeon has had experience in using, accessibility to radium, etc. I do not think that any one would say that all cases should be operated on or that all should have radium. Since Dr. J. F. Percy began treating large uterine cancers with heat below the point of carbonization he has done some wonderful work, and it strikes me that the use of heat below the point of carbonization would be effective in all these lid or superficial cancers, just as it is effective in the deeper-seated cancers. This I have not done in a large enough series to report.

A STUDY OF THREE HUNDRED CASES OF APPENDICITIS WITH SPECIAL REFERENCE TO PELVIC COMPLICATIONS *

ARCHIBALD MACLAREN, M.D.

ST. PAUL

I have taken for this study 300 cases of acute suppurative appendicitis, excluding all chronic, subacute, relapsing, and acute cases in which no pus was found. This is a consecutive personal list in which I have not included patients operated on by any of my three partners or by any of my assistants at any of the hospitals with which I am connected. Over 12 per cent. of these patients were operated on in farmhouses or country hospitals, and many of these have been my very worst cases, the patients being so sick that the family physician would not dare to move them. I feel sure from my experience that the cases which reached the metropolitan hospital from the country districts are always to a certain extent selected, and the best cases from an operative point of view.

In this study the especial interest to me has centered about pelvic rectal drainage and its influence on the mortality rate. Rectal drainage in these bad cases was original with me when I first used it, although I later discovered that it had been advocated by McNaughton, Stillman and others, whose publications I had never seen until I had operated on my first eight patients, whose cases were reported five years ago before the American Surgical Association.

I first tried to follow the ordinary method of dividing the perforated-appendix cases into two classes, general septic peritonitis and local appendiceal abscess. I soon discovered, however, that I could not make this distinction with certainty in border-line cases, either before or after operation.

It has been a matter of habit with me in keeping my personal records to note the approximate quantity of pus in each case, and this fact gives me an opportunity to make a division of my cases on this basis, which I believe is one of true value in determining the prognosis. The quantity of pus in a certain case is of great importance. The operation for opening a large abscess is much more dangerous, at any stage of the disease, than the same operation on a small accumulation of pus entirely aside from its virulence. I have arbitrarily designated 4 ounces as the dividing line for the reason that it is unusual to see a single localized abscess contain a larger quantity. When the quantity obtained is larger than this, there is usually a secondary abscess or involvement of the free peritoneum so that large abscesses can best be grouped with general peritonitis cases for this study.

I have taken 150 consecutive cases before my first rectal section and 150 consecutive cases since that time for a basis of comparison. In the first 150 cases there were 13 deaths, divided as follows: in 61 general peritonitis and large-abscess cases with four or more ounces of pus, 12 deaths; in 34 abscesses with less than 4 ounces of pus, 1 death; in 55 cases without rupture, either gangrenous, or appendixes, containing pus, no death.

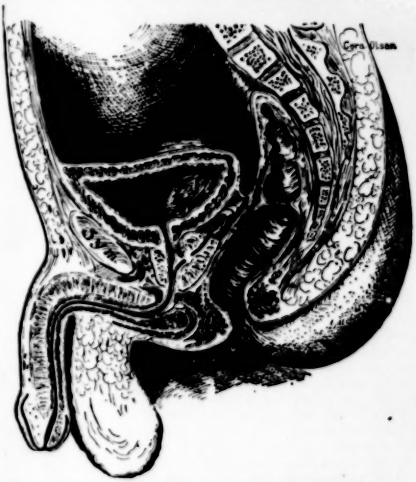


Fig. 1.—Normal midline section left half of pelvis.

In the last division I wish to say that most of these are the acute cases in which the patients are operated on in the first 48 hours of the attack. If the appendix was accidentally ruptured during the removal, the case was included as unruptured. The general mortality, then, is 8.6 per cent. During this same period operation was refused in three fatal cases in the hope that they would safely reach the eighth day (Ochsner). It seems to me that these should be added to the mortality list, which would raise the mortality to 10.6 per cent.

In the second series of 150 cases with operation since the use of rectal drainage, there were 7 deaths, disposed as follows: in 84 general peritonitis and large abscess cases, 7 deaths; in 32 small abscess cases, no deaths; in 34 unruptured, gangrenous and appendixes containing pus, no deaths. This brings the general mortality to 4.7 per cent.

In this second list there were 84 cases classified as general peritonitis as against 61 in the first list,

* Read before the Section on Surgery, General and Abdominal, at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

and there seems to be a corresponding fall in the unruptured cases, from 55 to 34. This may be due to the more general use of the Ochsner treatment or to the suspicion of the laity, created by many so-called surgeons who have been rushing to the hospital every kind of case from typhoid to ptosis. The second series includes many more desperately sick patients than the first, yet the mortality rate has been cut in

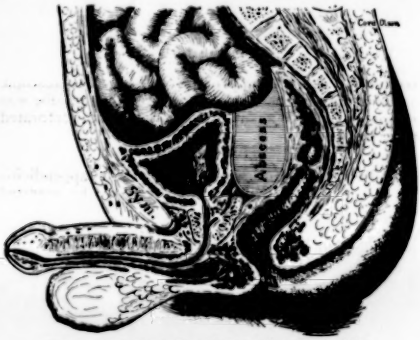


Fig. 2.—Small abscess in culdesac; right half of pelvis.

two by what I believe to be a life-saving surgical procedure.

The question may be asked, What relation has rectal section to these seven deaths? Was any death caused by rectal section?

Case 1.—The first death occurred after a laparotomy in a very sick child aged 6, first seen on the fifth day. This little girl died in stupor, twelve hours after operation, with pinpoint pupils and a gradually failing respiration. The nurse had given two hypodermatic injections of morphin, each supposed to be 1/12 grain. The first injection had no effect, and on account of her great restlessness two hours later a second 1/12 was given, which was soon followed by death.

Case 2.—Mr. S., aged 40; sick five days; died the day following the operation, pus having been found all through the abdomen; two abdominal drains, one in the right loin, one through the suprapubic stab.

Case 3.—Child, aged 7, very ill; first seen on the fifth day with marked pelvic abscess bulging through the anterior rectal wall. Rectal section and letting out a half-pint of thin serous pus; this child was so well for the next three or four days that she was considered out of danger. On the seventh day after the operation she was very sick again; a laparotomy disclosed another large accumulation of pus in the right loin. The laparotomy in this case should have been made on the second or third day after the rectal section. This child died two days following the last operation.

Case 4.—S. J., aged 25; operated on forty hours after perforation. Drain through the stab just outside of the cross-muscle incision; died on the seventeenth day from general septicemia associated with an erysipelatous inflammation of the abdominal wall and back starting from the incision. Since this case I never use the cross-muscle incision in pus cases.

Case 5.—Mrs. G., aged 63; operation in farmhouse; sick six days; supposed by her physician to be suffering from renal calculus; vomiting fecal in character for forty-eight hours; laparotomy; general septic peritonitis; two rubber tube-drains, one in the loin and one suprapubic stab into the pelvis; died in a few hours from shock.

Case 6.—J. O., aged 27; sick thirty-six hours; laparotomy; tube-drain into culdesac. On the eleventh day a rectal section was made; quart of pus; death same night: In this case the rectal section was delayed too long. It seems to me that with greater care both this patient and Patient 3 should have been saved.

Case 7.—G. L., aged 45; sick eight days; operation in a farmhouse; laparotomy; drain in right loin and rectal drainage; did not rally from the anesthetic.

In the first 150 cases there were six deaths; these six cases from their histories, seem to me now to have been suitable for rectal puncture. Three of this number were examined post mortem and the pelvis was found full of pus. The one case which particularly stimulated me to the use of this procedure was that of a boy who died, complaining bitterly because the nurse was inattentive to his bowels and would not bring the bed-pan as frequently as he desired. After death the sphincter was found dilated to an inch in diameter by the anterior wall of the rectum, pressed down by a large pelvic abscess. Thereafter I never considered an examination of any inflammatory abdominal condition complete without a rectal examination.

At first the operation of rectal puncture and drainage was confined to cases in which there had previously been operations for acute appendicitis. The accumulation in the culdesac would generally show itself by night pain, rise in temperature and pulse, and commencing septic appearance about six days after operation. Many times the culdesac was found distended with pus, even when a large-sized rubber tube extended from the wound or from an anterior-wall stab into the culdesac.

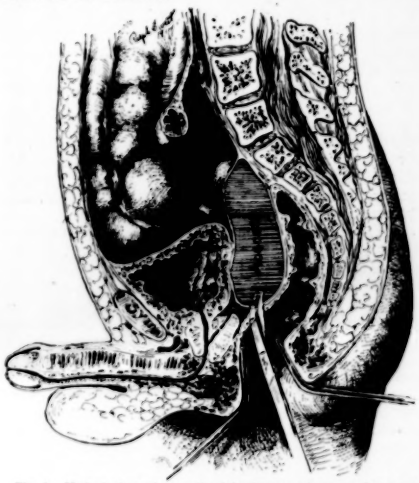


Fig. 3.—Method of opening small pelvic abscess; scissors used to puncture abscess and as dilators.

The reason for this is that intra-abdominal pressure exists at maximum only, when there are no peritoneal adhesions, and that as the adhesions increase in amount and strength the intra-abdominal pressure rapidly decreases to zero. I have several times seen cases, say, ten days or two weeks after operation, in which the drainage wound above was pouring out a perfect stream of pus, while the patient was rapidly losing

V. 191

ground, owing to septic absorption from a large pelvic abscess. Rectal section in these cases has quickly worked marvelous changes. In one case of this type, a boy seen at the University Hospital, who had a temperature of 102 every night, and was vomiting and so sick that he could not eat, was crying for food, after 2 pints of pus were removed, and this in four hours after the pus was evacuated. He rapidly recovered. After we had demonstrated the great value of this method in the postoperative cases, we extended its use to bad cases of patients seen late in the course of a perforative attack, who had not been operated on. Many of these have been young children who were first seen between the third and the sixth day, dangerously sick, with a marked distention of the culdesac. In such patients in whom the danger is of a back-firing of the pelvic abscess, with a fatal general peritonitis, the first thing done has been the making of a rectal section and the putting in of a winged rubber tube-drain. If the patient was entirely relieved, so far as

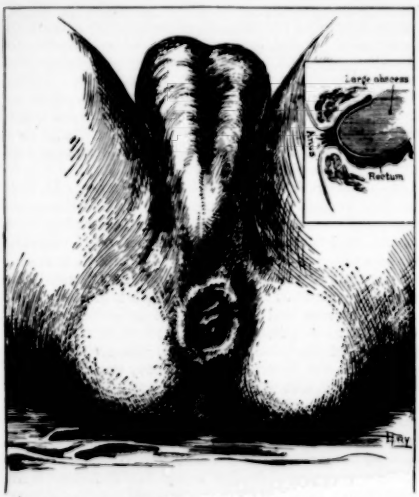


Fig. 4.—Dilatation of sphincter from pressure of large pelvic abscess through anterior wall of rectum.

pain and temperature was concerned, nothing else was done at that time, but usually the very next day, an exploratory laparotomy was done and the gangrenous appendix removed.

I believe in removing the appendix only when it can be done without adding any percentage of mortality to the operative risk. It is surprising how much more one can do toward removing appendixes, however, with added experience.

We believe that the rectal drainage is no more dangerous than vaginal section. In little girls we always use rectal section in preference to vaginal section. Up to the present time we have not used rectal section in adult women, but have continued to drain pelvic abscesses through the vagina, as has been done so successfully for so many years for all sorts of pelvic abscess.

I find that in this last 150 cases, I have considered it wise, to make a primary rectal section 11 times Secondary to laparotomy I have opened and drained the rectum 13 times, making a total of 24 rectal sections in 150 cases, or approximately 17 per cent.

With the exception of the two patients mentioned above, all the patients of this class treated with rectal section have rapidly recovered and not one has had a fistula. In one case when a large pelvic abscess had resulted from a perforating ulcer on the anterior wall of the upper rectum, drainage through this perforation promptly cured the abscess; when at the end of eight days the winged rubber tube was pulled out of the rectum the perforation promptly closed. Proctoscopic examination in this case two weeks after the tube was removed showed a small scar where the perforated ulcer had been.

CONCLUSIONS

1. The successful treatment of acute appendicitis depends on the time when the patient can be operated on after perforation, the earlier the better.
2. We should continue to impress this fact on the laity.
3. Drainage must be complete and, for a certain percentage of cases, rectal drainage is a most efficient measure.
4. After operation has been performed we must not forget these patients. The method of attack is not so important as eternal vigilance, constant watching and frequent rectal examinations, which should be made, if in the future we are to save some who would have been lost in the past.

914 Lowry Building.

HAS THE LAST WORD BEEN SPOKEN CONCERNING APPENDICITIS?*

JAMES E. MOORE, M.D.
MINNEAPOLIS

In 1582 Ambrose Paré said in the preface to his surgery that he had striven so successfully for forty years to bring surgery to perfection that posterity would not be able to surpass us save by some additions such as are easily made to things already discovered—and all that we have left of his teaching is the use of the ligature.

In 1882 Samuel D. Gross, founder and first president of the American Surgical Association and the leading surgeon of his generation, said, "Operative surgery challenges the respect and admiration of the world, and if it has not attained its finality it is as nearly perfect as we can hope to make it"—and he had never performed an appendectomy.

If these men, who were the greatest in their day, were so mistaken, it would be absurd for any of us to say that the last word has been spoken concerning any topic in surgery, for it is a live subject and while the present generation can justly claim that it has added more toward its perfection than has been added in all time before, future generations will doubtless improve on it to a point far beyond our fondest dreams.

The last word has not been spoken concerning appendicitis, and possibly never will be, because the

* Read before the Section on Surgery, General and Abdominal, at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

last word can not be spoken until the mortality from this affliction has been completely obliterated. A few years ago every program for this meeting contained too many papers on appendicitis, but for the past few years they have been too few. We have doubtless all changed our views since we had our last "battle royal;" is it not time, therefore, to review and see how our present views compare? If in our discussion we find that we are nearer of one mind we shall know that we have advanced. If, on the other hand, we find that we are as far apart as ever, we shall know that there is great need for improvement and that we must renew our efforts as though the topic were a new one.

Little has been added lately to our methods of diagnosis. That syndrome, diffuse abdominal pain which later becomes local in the right lower quadrant, vomiting, local tenderness, and muscular rigidity, is one that can not well be mistaken. The average case of acute appendicitis is the easiest of intra-abdominal conditions to diagnosticate, but there are exceptional cases in which the most skilled diagnosticians may be mistaken. Within one month we have had four patients in the University Hospital who had no pain, rise of temperature or vomiting when they were admitted. The evidence on which a diagnosis of appendicitis was made was the history of pain and vomiting before admission, the presence of muscular rigidity, and leukocytosis. In all four a ruptured gangrenous appendix and an abdomen full of pus were found. All recovered, but without operation would surely have died. The most common mistake is to make a diagnosis of appendicitis when it does not exist. Not every pain in the abdomen is appendicitis. In our northern climate pneumonia is frequently mistaken for appendicitis in children. Intussusception has not infrequently been mistaken for appendicitis. Retrocecal appendicitis is now a well-recognized condition, and a positive diagnosis of this condition can usually be made by a careful observer. Muscular rigidity over the appendix is the most reliable symptom of appendicitis, and when a patient has all of the other cardinal symptoms and this one is lacking retrocecal appendicitis should be suspected; and if tenderness can be elicited by pressure in the loin just back of the cecum a diagnosis of retrocecal appendicitis is quite certain. In some cases of retrocecal appendicitis psoas contraction is a marked symptom. Refinements in diagnosis should not be undertaken before operation, because it is a waste of time and a mistake in classification may lead to disastrous delay. The time to decide whether a case of appendicitis is catarrhal, perforative, or gangrenous is after the surgeon has removed the specimen.

The prognosis in appendicitis has become better each year, but there is still room for improvement. Statistics concerning appendicitis are preeminently unreliable, but it has been quite generally accepted that without operation there is mortality of at least 20 per cent. With operation at the present time the mortality rate is near 5 per cent., and in hospitals under expert surgeons it is less than this.

When shall we operate? Every surgeon has answered this question differently at different stages of his experience. Whether he began as a conservative or an extremist he has changed, because he had a mortality rate which he hoped to lower by changing. I began very conservatively, operating only when a well-defined abscess was present. Under this practice the operative mortality was low, but the mortality from the disease was high. Then came a period in which operations were performed by the calendar, or after careful selection. Under this practice the operative mortality was higher and the actual mortality considerably lower, but still too high. During the past few years the rule has been to operate as soon as possible after the diagnosis was made, and the actual mortality rate has been very much lower than that during either of the other periods. We abandoned the waiting plan because we have learned that while some patients will improve, many will die while we are waiting for a more favorable time for operation, and that no living man can tell what will happen in the next twenty-four hours in a case of acute appendicitis. After long experience with all plans we can conscientiously recommend operation as soon as the diagnosis is made, because it has been accompanied by the minimum mortality rate. We would not recommend this plan, however, for the unskilled operator or in the absence of hospital facilities.

In the Minnesota University Hospital we have had eighty-seven patients with acute appendicitis, all of whom have been operated on as soon as possible, with a mortality of but 3.4 per cent. This excludes all chronic cases and appendectomies made when the patient was being operated on for other conditions. Nineteen of them had extensive suppuration. It is of interest to note that all of our deaths occurred while we occupied the old frame building as a temporary hospital. The last forty-four cases have been operated in the new hospital with no mortality.

H. J. Paterson[1] reports a like experience. During the first period he rarely operated except in the presence of abscess, and never until the acute stage had passed, and the mortality was 16 per cent. During the second period each case was a law unto itself, and the mortality was 13 per cent. During the third period he operated as soon as possible in every case and in 95 cases had a mortality of only 5.2 per cent.

The term "operative mortality" means that the patient died in spite of an operation and not as a result of it. A few years ago a very common newspaper report was that someone had died from an operation for appendicitis. Even the laity have learned that the operation for appendicitis in competent hands is a very safe one, and that people die for want of an operation and not because of it. Christian Science is responsible for many more deaths from appendicitis than operations are. Many lives have been sacrificed and surgery has been brought into disrepute by surgeons who were striving to make a record. The record-maker is an unsafe man in surgery because he is very prone to give his record greater consideration than he does his patients. Every surgeon's actual mortality rate from appendicitis is made up of all deaths occurring among his patients whether he has operated or not.

Shall we always remove the appendix in acute appendicitis? To this question I answer, emphatically, No, because I have known of many instances in which the patient's life has been sacrificed through a determined effort to remove the appendix at all hazards. It should be remembered that the operation is performed to save the patient's life and not to remove the appendix. I have removed the appendix in fully 95 per cent. of cases during the past few years, but there have been a few cases, possibly one in twenty,

1. Paterson, H. J.: Brit. Med. Jour., Oct. 5, 1912.

V. 191

in which I deemed it safer to leave it. We believe that, at present, every experienced surgeon removes the appendix in the vast majority of cases, but that the best, that is, the safest, surgeons occasionally leave one. When the appendix is in evidence, it should always be removed, but when its removal necessitates the extensive breaking down of Nature's protection and the contamination of the general peritoneal cavity, it should be left for a later operation, when it can be removed with perfect safety. The leaving of the appendix in these exceptional cases with the established drainage is safer than its removal. The fact that leaving the appendix necessitates another operation is of no importance, because this is a matter of life and death and not of expediency. If it were the accepted practice to remove the appendix in every case, many lives would be sacrificed by inexperienced operators.

Should patients be operated on after an acute attack of appendicitis to avoid future attacks? The construction of the appendix is such that recovery is seldom if ever complete, and the fact that the first attack was a mild one gives no assurance that the next one will be. The interval operation is so free from danger, and later attacks of appendicitis are so often very dangerous, that we do not hesitate to advise the interval operation as a routine practice. In child-bearing women the operation should be insisted on.

How shall we treat appendicitis in pregnant women? Appendicitis in a pregnant woman is more than twice as dangerous as it is in a non-pregnant woman, and should be operated on at the earliest possible moment, for admitting that the operation and the accompanying anesthetic are attended with some danger, the disease without operation is infinitely more dangerous. The very great increase in danger during pregnancy is due to the facts, first, that two lives are in jeopardy, and, second, that the mother's condition renders her much more liable to grave complications. Abortion occurs in about 40 per cent. of these cases, which is always a very grave situation, and early operation is the best preventive of abortion. I believe that it is good practice to advise every woman who finds herself pregnant after a severe attack of appendicitis in which the appendix was not removed to have an operation as soon as she knows that she is pregnant.

The exact method of removing the appendix and of treating the stump is immaterial so long as it is skilfully done, for different surgeons employing different methods secure equally good results. In suppurative cases drainage is a very important matter, and is very often improperly carried out. It is a very grave mistake to plug the wound with gauze and depend on this plug for drainage, when it only prevents the escape of pus. My personal practice is never to use gauze for drainage except when it is surrounded by a rubber tube or rubber tissue, for it drains only serum and that for only a few hours, when its meshes are filled and it has lost its capillarity.

It is quite a common practice, at present, to place the patient in a sitting position to cause the pus to drain into the pelvis. I have not followed this practice, because it is based on mistaken theory, and it is an uncomfortable position for a feeble patient; and my patients have done just as well as those who were in a sitting position and have been much more comfortable. A few years hence this will be remembered as only a passing surgical fad. No matter what position a patient has been in before operation, with free pus in the abdomen the pelvis will always be full when it is opened. It is very important to pump out the pelvis in every pus case. Large-sized soft rubber tubes should be passed to the bottom of the pelvis and into the flanks. It is not necessary that they should run down hill, for the intra-abdominal pressure will care for that.

Syndicate Building.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. MACLAREN AND MOORE

DR. ALBERT J. OCHSNER, Chicago: Some five years ago when Dr. Maclaren brought out the facts contained in the present paper I recalled several instances in which, undoubtedly, judging from the symptoms, patients whom I had observed should have had this additional treatment. Since that time I have encountered four cases in which this condition existed. In one of these there was an additional condition which might have resulted seriously to the patient had it not been discovered by accident. The patient had a greatly distended bladder so that there were two points of bulging, one point a little lower than the other, which made me suspicious that the bladder might be full and that this entire mass might not be due to the abscess. When the bladder was catheterized the abscess remained, but the upper swelling disappeared. In following the histories of these four cases I found that each patient had been carefully treated for some time by the use of cathartics. The shortest time of treatment was four or five days and the longest eleven days. I have never seen this condition present in any case in which the appendicitis had not been treated by cathartics. Many a surgeon with less skill than have the surgeons in this splendid new hospital referred to by Dr. Moore has a mortality in 100 successive cases of less than 3 per cent. by following a method of treatment of which I have spoken so often before this Association that the older members must know it by heart by this time. If in those cases in which the surgeon is doubtful, or feels that he cannot expect recovery, he inhibits peristalsis by washing out the stomach, performing gastric lavage and giving absolutely nothing, not even water by the mouth, feeding by the rectum, he will find that the mortality in this class of cases will be reduced to less than 2 per cent. Dr. Moore's plan of counting mortality is absolutely correct. Every patient with appendicitis who dies must be counted whether operated on or not. I believe in the Fowler position, and agree with what Dr. Moore said about operating during gestation. The reason the diagnosis is frequently not made is because in these cases the surgeon has not the intelligence or does not give the attention necessary to make a physical examination. Usually a patient who comes without having had an early diagnosis is one in whom the doctor took something for granted, not making a physical examination to begin with.

DR. J. M. T. FINNEY, Baltimore: Dr. Moore's paper was so sane and founded on such good surgery and pathology that it is difficult to disagree with him in any respect. There are one or two points, however, with which I disagree. He said the last word has not been spoken, nor will it be spoken until we have 100 per cent. recoveries. I agree with this statement. In appendicitis, in my judgment, the mortality is absolutely preventable. When a death occurs from appendicitis it is *prima facie* evidence that somebody has made a mistake. When pus is found in appendicitis, it is also *prima facie* evidence that somebody has blundered. It is not always the physician, nor is it the surgeon. It is not infrequently the patient or some officious member of the patient's family who interferes, and doesn't send for the doctor early enough. No case of appendicitis should progress so far as the formation of pus. I understood Dr. Maclaren to say that he had had no mortality whatever in any patient operated on except when pus was present. That is my experience. I think that it is the experience of a great many surgeons. If that is true, and the well-known and safe paths are followed in operating on these patients, I believe that mortality can be absolutely elimi-

nated in operations for appendicitis. This whole question, then, resolves itself into one of diagnosis. If the patient can be seen early enough, and if no mortality occurs in patients with appendicitis operated on except after the appendix has ruptured, it necessarily follows that 100 per cent. of recoveries will occur in patients operated on. That is a proposition which cannot be gainsaid in view of the facts in the case. If, then, it is a question of diagnosis, the thing we should devote our attention to for the time being is to improve our methods of diagnosis. There are ways in which that can be done. I cannot mention them all. Attention should be called to one or two points, however. If one has conscientiously examined his patient, as Dr. Ochsner says, if he has made use of every means at his disposal to make a diagnosis, and if he has failed to satisfy himself as to the existence or not of an appendicitis, if the condition of his patient is such as to make him believe that there is some more or less serious condition, it is the duty of the surgeon to offer, indeed, to insist on, operation. Make the diagnosis at the time of the operation if necessary, don't wait until the patient is as good as dead, and then attempt to do the impossible. That may seem to be an extremely radical position, but it can be backed up by the facts in the case, by statistics, by results, and that is what we are after. I call attention to the fact that appendicitis in children is a very different proposition from appendicitis in adults. I called attention to this fact in a paper some years ago, and reported a long list of cases coming under my observation in which all sorts of bizarre diagnoses had been made for appendicitis or the reverse. I have operated on a great many patients that I thought had appendicitis which did not so prove. I do not regret one operation. I am sorry to say I can look back on a goodly number of patients on whom I did not operate when I should and I had grave reason to regret it.

DR. LINCOLN DAVIS, Boston: Much credit is due to Dr. Maclaren for his pioneer work in pointing out the advantages of rectal drainage in cases of appendix abscess. If we could operate on all cases of appendicitis at an early stage, there would be no need of this procedure. Unfortunately, in spite of much missionary work on the subject by surgeons, cases continue to come into our hospitals from the fourth to the tenth day of the disease, with large accumulations of pus. There is no doubt that there has been a great improvement in the mortality after operations for appendicitis in the last few years. This is due, I think, to three factors: (1) more efficient operation; the appendix is removed with less disturbance of the peritoneal cavity; (2) better drainage; the cigarette wick is certainly an advance over the old gauze pack; (3) more intelligent after-care. In the cases in which residual abscesses form after operation in spite of our best efforts to drain from above, there can be no question that rectal puncture is very definitely indicated. It is certainly safer to open such abscesses from below, rather than to poke down through the wound.

Preliminary rectal puncture, as advocated by Dr. Maclaren, has a more limited application, but still a very definite one in a small number of cases. I have not used it in just that way. I have drained two cases of appendix abscess by the rectum, without abdominal operation, with good results. The method is risky. The patient must be closely watched. There are nearly always two abscesses, one at the site of the appendix and the other in the pelvis. The drainage of one does not necessarily drain the other; therefore, after having drained the pelvic abscess, watch with the greatest care that there is no septic absorption from the original focus.

One point on which I do not fully agree with Dr. Moore is with regard to the value of Fowler's position; we use it extensively at the Massachusetts General Hospital. Postoperative rectal seepage is a life-saving procedure. Avoidance of violent catharsis is also an important matter. I have looked up all of my cases at the Massachusetts General Hospital, 249 in number. These were all acute, including general peritonitis as well. Every patient seen was operated on. Some of the cases were desperate ones. If they are sicker in the country farmhouses, they must be very sick indeed. In all but nine cases drainage was done. The appendix was removed in all but thirteen cases, in which there was merely drainage of the abscess; in two cases by rectal puncture. There were thirteen deaths from all causes; mortality 5 per cent. plus. Secondary operations were done in ten cases; five were for drainage of residual abscesses; two by vaginal puncture, one by rectal puncture and two by incision in the flank.

THROMBOSIS AND EMBOLISM, THEIR SIGNIFICANCE AND CONSEQUENCES IN ABDOMINAL AND PELVIC SURGERY*

ANGUS McLEAN, M.D.
DETROIT

A condition which has been before the medical profession for many years, especially since the inception of modern surgery and modern surgical technic—a condition which is becoming more frequent with the ever-increasing number of abdominal and pelvic operations—a condition about which much has been written but concerning which little is known definitely, is the subject I wish to bring to the attention of this Section to-day. I refer to thrombosis and embolism.

The importance of this subject is at once apparent when we consider the great rôle played by thrombosis and embolism in raising the mortality in our surgical cases. Besides the mortality, the morbidity caused by these conditions is no small matter. Many are the cases of pulmonary, renal, and hepatic abscesses, not infrequent the cases of gangrene of extremities, necessitating amputation, that had their origin in thrombotic or embolic processes. Arteriosclerosis, a disease that in the course of time has been attributed to many different causes, is now looked on by many as originally due to embolic occlusions of many of the smaller vasa vasorum, is really the beginning of the arteriosclerosis. How does syphilis cause arteriosclerosis? The *Spirochaetae pallidae*, circulating in the blood, become lodged in the smallest branches of the arteries. Their lodgment in the smallest ramifications of the vasa vasorum is really the beginning of the arteriosclerotic process. Likewise the other chronic low-grade infections often result in the same terminal process. These conditions do not, however, concern us now. In this paper I wish to consider, more especially, postoperative venous thrombosis and its probable resulting embolism.

Several etiologic factors are usually given as necessary for the formation of a thrombus: (1) trauma, especially injury to the endothelial lining; (2) stagnation or slowing of the blood-stream; (3) infection, and (4) chemical changes in the blood itself. Regarding these causes it is hardly necessary to say that not one is alone sufficient to produce a thrombus. When a thrombus does occur it is usually due to various combinations of these causes acting together. Again thrombosis often occurs, as, for instance, a femoral thrombosis that follows a surgically clean appendectomy, when, as far as we can ascertain, each one of these factors is wanting. We are therefore forced to look for some other etiologic factor in such cases. With the hope of finding some explanation for the thrombotic process in these cases, we† undertook some experiments on dogs.

* Read before the Section on Surgery at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

† Drs. R. C. Andries, W. D. Barrett and myself.

EXPERIMENTAL WORK

Experimentally, thrombosis is a difficult subject to work with, first, because of the difficulties that confront us in blood-vessel surgery generally and in the post-mortem findings in particular (as for instance locating the point of lodgment of an embolus) and, secondly, because the conditions under which thrombosis and embolus occur in the human being are difficult and practically impossible to imitate. At the outset we will say that we were unable to find any reason for their occurrence. We were, however, much impressed with the tremendous amount of injury a vein can withstand without the production of a thrombus at the site of the injury. Indeed, it is quite a difficult problem to produce a thrombus experimentally. In daily surgical work, all of us avoid injuring blood-vessels as much as possible. We always fear the possibility of causing a thrombus to develop.

In our experiments we noticed several interesting phenomena:

1. When a vein is ligated in continuity the blood in the vein will clot only on one side of the point of ligation, that is, the side from which the blood is coming.

2. In ligating a vein between two ligatures (say 2 inches apart) the blood between the ligatures clots very slowly and then only if the endothelial lining is injured, and if left for a week or more the contents of the ligated vein will have entirely disappeared, a fibrous cord-like structure alone remaining.

3. Simple crushing of a vein will not cause a clot at the point of crushing. The crushing can be repeated in forty-eight hours and a clot will not form at the site. Examination of the repeatedly crushed vein two weeks after the last crushing will show a thickening of all the coats of the vein due to an increased amount of fibrous tissue, the intima remaining as smooth and glistening as before.

4. Crushing of a vein with the subsequent introduction of a twenty-four-hour bouillon culture of staphylococci and again crushing the vein to grind (as it were) the staphylococci into the walls of the vein, will not produce a clot or thrombus at the site of the crushing and injection of the staphylococci.

5. The introduction of a sterile thread into the lumen of a vein, allowing about one half to three quarters of an inch to remain suspended inside of the vein, that is, oscillating in the blood-stream, failed to produce a clot or thrombus either at the point of the introduction of the thread or around the thread itself.

6. The introduction of a thread infected with *Staphylococcus albus* or *aureus* will in three or four days cause the formation of a thrombus at the point of the introduction of the infected thread. The thrombus becomes attached to the vein at the point where the infected thread enters. It will not entirely occlude the lumen of the vein; it will grow or enlarge in the direction of the blood-stream, remaining suspended at a single point. (See illustration.)

On examination of an induced thrombus of this kind it can readily be seen how easily such a thrombus could be torn from its small frail attachment, circulate in the blood-stream and become lodged somewhere in the pulmonary circulation and perhaps produce a fatal termination. In our experiments we were never fortunate enough to encounter such a termination. If such a thrombus did become detached in whole or in part, it lodged in a locality which had an abundance of collateral circulation and therefore passed unnoticed.

It is difficult to conceive a condition in a patient similar to the one in which we were able to produce a thrombus in the dog; but the difficulty found in producing a thrombus experimentally shows that there must be factors other than injury to the vessel, slowing of the blood-stream and infection that bring about a thrombotic process in human beings.

In necrosis, substances are produced which cause coagulation in the blood-serum which comes in contact with the necrotic tissue. Whether these substances first cause a hemolysis, a conglutination of the platelets and red corpuscles—a view usually held in regard to the method of thrombus formation—or whether these are substances akin to fibrinogen, and thus directly cause the coagulation of blood in the vessels, is not known. Is it perhaps possible that, when thrombosis occurs after a surgically clean operation, during the operation certain ligatures have been placed in such a way as entirely to cut off the blood-supply to certain areas, which subsequently become necrotic and liberate the substances necessary to complete the coagulation of blood in the surrounding vessels?

RELATION OF THROMBOSIS AND EMBOLISM TO OPERATION

In looking up the statistics we find that thrombosis and embolism follow operations for large pelvic tumors more frequently than any other operations. Of forty-eight reports of cases collected by Schenck[1] 58 per cent. followed operations for the removal of large pelvic tumors. Schenck[2] also shows that in 3,204 myoma operations from twelve different clinics namely, those of Goldman, Burnham, Wenczel, Duvergey, Hofmeir, Klein, Zurhelle, and Kelly, ninety-six, or 3 per cent., were followed by thrombosis. My own records of the last two years show that in 1310 laparotomies there were twenty-six cases, or about 1.9 per cent., that were followed by thrombosis or embolism. There were eight cases of fatal embolism, three cases of pulmonary embolus in which the patients recovered without further trouble, two cases of pulmonary embolus followed by lung abscess with recovery and one case of embolus of the liver followed by an hepatic abscess with recovery. Besides these cases of embolism there were twelve cases of femoral thrombosis all of which followed pelvic operations. Of the fourteen cases of embolism, eight, or 57 per cent., followed prostatectomies and hysterectomies. The striking thing in all cases of embolism and thrombosis in our series is that there was only one case of embolism with recovery and no cases at all of thrombosis that followed operations in the upper abdomen. This one case followed an operation for suppurative gall-bladder disease. In the cases that are most frequently followed by thrombosis and embolism there is always a certain amount of pressure exerted on surrounding structures. The circulation, especially the venous circulation, is retarded and extensive varicosities are quite common. There is also ample opportunity in these cases for remnants of tissue remaining, either in the form of devitalized pedicles or, as in the case of prostatectomy, shreds of connective tissue, which subsequently become necrotic and give off the substances necessary for the development of a thrombus.

Perhaps the most striking proof of the theory that necrotic tissue does cause thrombosis is presented in

1. Schenck: New York Med. Jour., Sept. 6, 1902.
2. Schenck: Tr. Am. Gynec. Soc., 1913.

those cases of pyosalpinx in which the whole fallopian tube is adherent and necrotic and can be removed entirely without ligating a single vessel. Similarly a necrotic appendix can be removed without ligating the appendiceal artery. Here ligation is not necessary because all the veins and arteries are already thrombosed from being in proximity to the necrotic tissue. The bleeding that does occur in these cases is simply an oozing from the newly formed capillaries that have developed in the adhesions.

We know that thrombosis is more apt to follow septic cases than aseptic ones. This can be readily explained. If the necrotic area is large it is difficult to imagine how it could remain free from infection even if it is an infection of such low virulence as to escape clinical detection. If therefore to the process of simple necrosis we add an infectious one, then we really have another factor for the production of a thrombus. We have an infectious condition, coincident with which there is always an inflammation and in the first stages of inflammation a slowing of the blood-stream is noticeable. If slowing of the blood-stream, inflammation and infection are at all contributory to the formation of a thrombus—and I believe they are—then the presence of all these factors, acting together with necrosis, ought to give us the greatest percentage of cases that are followed by thrombosis. This is exactly what happens clinically.

Thrombosis and its consequent embolism rarely occurs before the eighth day. The usual time is from the eighth to the twenty-first day. Recently a case came to my notice in which a fatal embolism occurred as late as two months after an operation for a uterine myoma. This is a rather slow process, but complete necrosis of the tissue, on which thrombosis to a great extent depends, is not a rapid process. It usually takes a week or ten days, about the length of time in which thrombosis usually appears. The thrombus that forms during this time may remain undisturbed almost indefinitely and again, at almost any time it may become dislodged wholly or in part, and give rise to an embolus. This explains why the time of appearance of a thrombus is earlier and more constant as compared to the late and quite inconstant appearance of an embolus.

The great majority of postoperative thromboses, except perhaps those which occur after mastoid or sinus disease—and these occur in the internal jugular vein—are found in the femoral or external iliac veins. In discussing the cause for the comparative frequency of femoral and iliac thrombosis, Clark[3] came to the conclusion that it is due to the effect of traumatism exerted on the deep epigastric vein. The primary thrombosis originates in the deep epigastric vein and is slowly propagated along the line of that vessel until it reaches the external iliac vein, where it gives rise to a retrogressive thrombosis in the femoral vein. The long interval between the operation and the appearance of the femoral thrombosis suggests a slow process starting some distance away. It can be seen how a thrombus, once established in the deep epigastric vein, can be propagated to the femoral vein; but that simple trauma by retractors or the like should start a thrombotic process in the deep epigastric veins seems rather improbable, on the grounds that the most severe injury can be inflicted on veins without causing a thrombosis.

Can the formation of thrombosis and subsequent embolism be prevented? As long as we are unable to say exactly on what factors thrombosis depends, so long shall we be unable to say definitely, whether or not we can prevent their formation. The probable causes as they present themselves to-day should of course be avoided. It is not possible to do this at all times. We cannot always avoid necrosis of tissue nor can we always avoid infections, for infections are often present before the case comes to the surgeon. In fact, they are very often the condition for which the patient seeks relief. Once a thrombus has formed, however, we can to a large extent avoid the occurrence of an embolus. The limb should be elevated to encourage the venous circulation, and kept warm, wrapped in cotton and surrounded with hot-water bags. Some advocate ligation of the vein proximal to the thrombus, but this we believe impractical in most cases and of doubtful benefit. Absolute rest must, however, be insisted on as a precaution against secondary embolism. This rest must be kept up until the clot has had a chance to become thoroughly organized, a process which will usually take from three to four weeks. If after the lapse of this time the patient is fortunate enough to have escaped the formation of a fatal pulmonary embolus from his thrombus, if he has escaped the long and tedious invalidism consequent on the lodgment of an embolus, either septic or aseptic, in his liver or elsewhere, his subjective suffering and discomfort is not at an end. Thayer[4] examined a number of cases of postoperative venous thrombosis several years after their occurrence and found that, when the femoral and iliac veins were involved, the afflicted extremity was usually considerably and permanently enlarged. It presented varices often terminating in ulceration; in addition, there was marked weakness and cramps especially at night and on overexertion. Schenck[2] was able to gather the late histories (that is, four years old) of twenty-nine patients in the forty-eight cases in the Johns Hopkins series. Eight of them had symptoms for about four months and subsequently no trouble. Two had some difficulty in walking for about twelve months. Nineteen never fully recovered, being troubled with swelling and with more or less pain. On this basis he concludes that "it is fair to assume that about 65 per cent. of the patients never fully recover and that if complete restoration is to follow it will come before the end of the first year, by which time the collateral circulation is as completely established as it ever will be."

Some one has said that surgical morbidity does more to bring surgery into disrepute among the laity than surgical fatality. It is more lasting and it is continually and prominently before the people; whereas fatality is soon forgotten. If this is so, thrombosis and embolism more than any other condition should ever be in our minds as one of the possibilities that may put a practically indelible blot on even the most skilful surgery.

CONCLUSIONS

Endothelial damage, on which so much stress is usually laid, is not, *per se*, a cause of thrombosis.

Necrosis of tissue plays an important part in the production of thrombosis.

The main contributory causes are, probably, a low-grade infection, not of sufficient virulence to be noticed clinically, and slowing of the blood-stream.

308 Washington Arcade.

3. Clark: Univ. Penn. Med. Bull., July, 1902.

4. Thayer: Med. News, 1904, No. 2.

V. 191

STANDARDIZATION OF SURGERY

AN ATTACK ON THE PROBLEM *

ROBERT L. DICKINSON, M.D.
BROOKLYN

At one time the surgeon was almost the only skilled mechanical worker with a craft knowledge analyzed, recorded and disseminated. Now the man with the shovel and the apprentice bricklayer have outstripped him in technic, for in their activities essential motions, tools, and economy of effort have been studied and standardized and taught, while we who think ourselves open-minded scientists look askance at propositions to apply to ourselves measurements of action and efficiency and fatigue, record of errors, instructions in type, motion-training, submission to discipline and new adjustments of function and cooperation. The high average of equipment, dexterity, information, conscientious care and self-sacrificing humanity in operating-rooms, great and small, here and abroad, are matters which some years of planned travel and laborious note-taking heartily attest; but evidence is not lacking that advance is very irregular where it might be all along the line, and erratic rather than on any studied and unified plan.

Is it unfair to affirm that, on the whole, surgery is unstandardized? For example, what is standard nursing? Does Germany have an idea of American ward practice in this line? What is the standard treatment of chronic non-operative disabilities? Has America shown evidence of acquaintance with the outfit of nearly every large German hospital? What is high-grade care of the well-to-do, of the poor? Has London an inkling of the provision for private patients which is a feature of our hospitals, even in small towns? On the other hand, have we any understanding of their organized insurance relief among the lower classes? In surgical teaching how many countries have copied the one that gives nation-wide promotion for merit? Indeed, to make the point we do not have to select the larger issues; elementary every-day instances will do. For the simple abdominal incision where every factor may be worked out to standard, who has run a long course of tests? In stitching and tying have we settled what are the swiftest motions, as a peasant lace-maker has; or do we ever go into training for correct form? Yet piano-players, pugilists and golfers study these things. The diamond knows every player's batting average, the race-track publishes records, the government office rates men for accomplishment. But there is no hospital governing board which, when a vacancy occurs, or the day of annual reappointment comes round, can ask for the equivalent of a fielding average, or track performance, or rating for character of work done as applied to a visiting surgeon, a house surgeon or a nurse. A consensus of opinion made up of general impressions, of personal preference and prejudice decides. Who determines, anyway, whether a man is fit to operate at all? A doctor without surgical qualification may engage bed-room and operating room in one of the dozen private sanatoriums in any large city, or in the hospital of the little community, and proceed to do the gravest of operations. Until now the patient has had no way of knowing whether or not the doctor has had surgical training. There is no graded standard at all. That the public does not want to be protected and would hinder standardization and legislate for "medical freedom" hardly lessens the duty to lay bare the facts and to present some plan for betterment. We may first, however, get some notions of what that plan might be and set them down. For we would not like to admit the extent of our ignorance, all the way from the specific requirements as to just what is the best material for a knife-blade, or the best way to sterilize it, up to the number and kind of hospitals needed in a particular type of community.

A beginning has been made. What has been done in Germany is ably recorded in Grober's book. Our hospital superintendents have one of the most practical and effective organizations in the country. A group of independent New York hospitals is working together in several matters, such as purchasing, issuing reports, checking up of the end-results of each surgeon's work, and promotion for merit rather than for seniority. Dr. W. G. Thompson of New York has shown the unnecessary number of miles of walking done by ward nurses because of poor room planning. Philadelphia has a Committee on Hospital Efficiency named by its County Medical Society to study the whole situation there with an efficiency engineer, Mr. Richard Waterman, as its secretary. Each of the fifty-five hospitals of the city has been invited to send to a conference an "efficiency committee" made up of the superintendent, a member of the lay governing board, and a member of the professional staff. There questions of uniform accounting, cooperative social service and studies of end-results are taken up. The reports are to be had from Dr. Edward Martin, 1506 Locust Street. The New York Board of Estimate has published pamphlets covering investigations by Mr. Henry Wright concerning Bellevue and Allied Hospitals, and has recast the organization. A beginning in the coordination and standardization of dispensary work has been made for the clinics of New York (and also of Brooklyn) by the Associated Out-Patient Clinics of the City of New York, with an office at 17 West Forty-Third Street. Groups of picked men of allied interests have found that at a cost of a couple of thousand dollars within the space of five years and by a very moderate alteration or enlargement of ordinary vacations they can see the best clinics of Europe and America at work and thus select the best experience. Surgical literature is abstracted in a way more nearly approaching symmetry and completeness than ever before in the joint American-German-French publication the *International Abstract of Surgery*. Furthermore, the degree of the American College of Surgeons will set a new standard here so that the public will understand what qualifications are fundamental. And, lastly, there is a demand for the standardization of hospitals that cannot fail to bring about far-reaching results.

A GENERAL PLAN

A scheme or proposal for standardization of hospitals and surgical technic and procedure and surgical outfits would be worthy of wide and concerted effort. How should it be attacked? I have tried to find out. Dr. Hornsby answers that the organization of hospital superintendents shows that they are fully awake to the need and have made great advances on the administrative side. The father of the newer studies of efficiency in industry, Dr. Frederick W. Taylor, who

* Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

has praised operative work as an example of well-planned procedure, writes me as follows:

In applying the principles of scientific management to hospitals I am sure there is an immense field . . . the best progress can be made if the work is done under the guidance of a man who has had practical experience in changing over from the old to the new type of management. . . . Unless the introduction of the new methods is made the special work of a man whose whole success depends on making

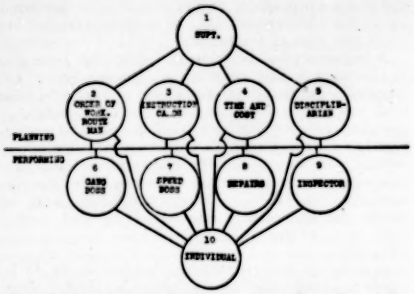


Chart 1.—Functions of scientific management, New England Butt Company, Providence, R. I., 1912.

quite rapid progress, the details are so great and the obstacles so many that even after a year or two of work, almost nothing seems to have been accomplished.

Then he gives warning that there are a multitude of fakers posing as efficiency engineers.

In Mr. Waterman's activities in Philadelphia, referred to above, an attack was made on the big problems in a basic fashion. That committee has not yet, I understand, reached the consideration of a plan of study of general surgical technic.

Mr. Frank Gilbreth, while condemning our methods rather fluently, has a program to suggest to us. He alone, as far as my questioning goes, has an answer to the query—yours and mine—What can I do—do now—to work out this thing in my own hospital, in my own line? This engineer has seen a considerable amount of operating in the United States and Canada and some in Europe. He has taken moving pictures of operations at New York Hospital, where he is consultant engineer, though he is, unhappily, too busy a man to be able to give much time to the institution. He asserts that hospitals are far behind factories in effective organization; that from 10 to 30 per cent. of precious ether moments could be saved, more especially in the period of preparation. "Surgeons," he says, "think not in terms of elementary motion, but in periods of elapsed time."

He outlined for me last February the way he would go about the study of our problems. He said:

The ideal way would be a demonstration hospital, but until one is started any institution could do these things: first, lay out a form for making a record; next, record the present practice in minutest detail; third, examine the data thus gained; fourth, organize a planning department, and last, adapt to your special needs the plan of carefully separated functions, with their functional foremen.

With regard to the study of detail, make stereoscopic pictures of everything. No detail is too small to write down. Trace the route of a pill from the manufacturer until it goes down the patient's throat. Make the most painstaking statement of every single item of outfit and action. A doctor should be assigned to the engineer who would do this, taking, if necessary, two years and making Century Dictionary-sized volumes.

As to the examination of the data, it is astonishing how just the laying bare of cold facts will be enough to reform and abolish no small proportion of the things that are wrong. Most institutions boggle at the proposal to make this kind of record. They are afraid of it. Most surgeons resent it, refuse it. But this is the way to better things—to chart every break in technic, stick it up, be public about it. And cure results.

In the matter of the planning department, ask any institution for its chart. It looks foolish. It hasn't any chart. [He showed the chart of a factory organization (Chart 1) and commented on it.] This chart may be modified easily to fit the health factory. The important matter is to divide and define the functions of the various individuals, particularly of the foremen. The questions in a factory or in a hospital are these: Who? When? Where? How? Upon what man does each one of these things depend for advice and control? There would have to be some alteration to fit this class of institution. For instance, there would be no speed boss. In place of a gang boss there would be a teacher. There would be a repair man. There would be an inspector, who would be a very important part of the organization. His work would be not so much investigation as prevention. Investigation is the finding out of the cause of trouble after it happens. Inspection is the keeping of everything up to the mark so that trouble does not happen. One might be said to be post mortem, the work of the pathologist. The other might be said to be preventive medicine. This man need not be a medical man. He is the checker up and is not the man who punishes or disciplines, for when he finds something going wrong, such as a nurse dropping gauze on the floor on her way to do a dressing, or making unsafe contacts, it is he who reports to the disciplinarian. All breaks, all technical errors of whatever kind are entered by him. If a surgeon makes a fault in technic it is entered without malice and without any other idea than that of checking up. Publicity about this list of errors is the great way of stopping trouble.

The disciplinarian is the man who decides all the questions bearing on faults made. His activity is not that of bouncer in general as the word suggests. A workman may

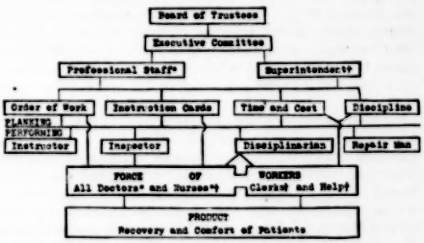


Chart 2.—Functions of scientific management in hospitals (suggested by Gilbreth, drawn by Dickinson); *=professional control; †=executive control. Alternative: Omit "Professional Staff."

commit several faults. Under the old régime it was three times and out. Then he was bounced and a new man put in who was allowed to make four errors and then he was bounced and went off and got another job. Under the new way when the first man has made errors—one, two, three—he is every time gently but persistently corrected and correction continues until he ceases to make that particular error.

As far as possible all activities are charted in a peak and valley drawing. The peaks and valleys give us the clue to the high and low points of all our work and we proceed on these clear indications.

Be simple. Use few tools. Imagine yourself operating out under a tree. Hunt out the best experience, measure it, make it standard, write it down on an instruction card. Above all get your people thinking in terms of elementary motions.

The merit of these suggestions by Mr. Gilbreth lies herein, that he gives us something concrete to start on. The medical practitioner is still trying to work on the old one-doctor-one-patient scheme. American practice in surgical services has no clear plan. It works on what might be called a one-surgeon-all-function idea. In large hospitals the usual arrangement is this: The visiting surgeon is responsible, in his wards, while on a three months' tour of duty, for many varying and ill-defined activities. He plans, teaches, inspects, executes. His ideas may vary not inconsiderably from those of his predecessor or the man who follows him, but he has neither chart nor detailed written instructions to show others what these ideas are when his trimester begins. His force is yet to be drilled. By the time it leaves him it has begun to appreciate his needs and the group is working together. Members of the house staff are frequently jealous of and openly rebellious at assistance, however skilled, given at operations by qualified older assistant visiting surgeons. Except for the one in charge, the nurses are furnished to the operating-room to be trained and are removed as soon as effective. Checking up by the visiting surgeon is sporadic, never covering all detail in the whole of his service, never overlooking an entire day's activities. Supervision of a visiting surgeon is unknown. It is not too much to say that he actually accounts in details to no one, and presents no balance sheet.

In hospitals where a surgeon's service is continuous, some system prevails. Even here, however, there is no answer to the question as to how many hours a day or a week he is required to give to this unsalaried service. Nor is tenure of office fixed. Usually it is for life. The juniors serving long years never know what prospect there is of promotion. Nor can able men not connected with the hospital determine whether opportunity or experience may be obtained in service there, as they might should a limit of fifteen years be named for such service or a Codman plan of measuring men by their results be instituted to weed out incompetents.

PLANNING DEPARTMENT

While studies looking to wide changes in organization are under way, parts of the factory scheme might be adopted, such as a planning department, instruction, inspection. As to order of work and instruction cards, rules and regulations exist in every hospital—in the back of some dusty drawer. Wherein are many dead letters and few directions for details of every-day procedure. Ward routine is tradition; a newcomer alters it at will; an enema is given in three or four ways. A house officer starting on service gets directions as to his duties passed along by word of mouth. A head nurse imported to take charge of the operating-room rarely finds these things: a schedule of duties and of outfit; formulas; a list of stock instruments as agreed on by the staff, each article catalogued by its name and picture (in a place where tools are very various); diagrams of the instrument table for each operation or class of operations, and typewritten details of the procedure adopted as the standard average in this particular set of operating-rooms. Yet every employee can be provided with a schedule of duties and belongings. In any hospital, in each of the sections of the planning department—order of work, instruction cards, time and cost, and discipline—the study of precedents and conditions could be taken up to-morrow and in time fairly complete schemes be submitted. This could be done by one man committees or members of the professional staff combined with the executive.

INSTRUCTION

The drill of the house surgeon cannot properly take place when explanation, question and pause are impossible—with blood spurting and seconds precious. The training in aseptic operative technic of the specialist on the eye, ear, nose and throat cannot be worked out by himself, yet there is no one whose duty it is to show him. These are but examples. High or low, every one of us needs better knowledge of standards and new methods. In no rationally planned way can this be brought about save to agree on standard and to delegate the general teaching and leveling up to some qualified individual or individuals. In the training-school we are used to this daily instruction. On the professional side it is haphazard.

INSPECTION

It is not easy to adjust our point of view to the idea that the actions of all of us are to be checked up and compared with certain standards while our breaks are calmly tallied and bulletined and our results are openly scheduled. As it is at present a visiting or associate surgeon may be a striking success in diagnosis or technic but in other points like after-care or progress or humanity be grievously defective. Who may tell how the balance is to be struck under present methods?

SUMMARY

Pending the working out of a comprehensive plan we have outlined the progress already made in the direction of standards and coordination, and pointed out the way an individual surgeon or service may begin to try out certain of the advanced methods adopted in the management of industries. Some of these are new adjustments of "function" (responsibilities and duties) clarified, charted, defined; regular instruction, such as drill in technic and manual dexterity and correct form; practice in team work; the printing on instruction cards of the best standard practice covering all ordinary acts and activities; constant inspection by one delegated to this duty; record of successes and errors like a ball-player's fielding average or a government office tally of character of work done; promotion by rating, and finally, a series of studies, undertaken as in the other mechanical crafts, by measurement of motion, speed, fatigue and efficiency.

168 Clinton Street.

The Habit of Observation and Medical Education.—The one constant characteristic of all those great men who have done so much for our science is their power of accurate observation and logical deduction. . . . This habit of accurate observation is one which it is not easy to acquire. . . . But in acquiring this habit you must not be conscious of doing so, for this "self-training, self-suspicion and self-discipline" consists in absolute concentration on the work which you are doing at the moment, the cultivation of a desire for knowledge for the sake of knowledge alone, and the putting behind you of all desire to generalize or theorize without a thorough sifting of the facts. You must not constantly be looking for the practical application of the knowledge you acquire. Be content to acquire it, resting assured that the practical application will come in some form later. —B. P. Watson, *Canadian Med. Assn. Jour.*, June, 1914.

KRAEPELIN'S CONCEPTION OF PARAPHRENIA *

MORRIS J. KARPAS, M.D.
Assistant Resident Alienist, Psychopathic Department, Bellevue Hospital
NEW YORK

INTRODUCTION

The subject of paranoia forms one of the most important chapters in the history and evolution of psychiatry. Esquirol, Laséque, Hoffman, Snell, Westphal, Mendel, Kraepelin and a score of others helped to lay the foundation of the paranoia concept. Esquirol attempted to bring a group of cases of paranoiac conditions under the heading monomania; in 1852 Laséque described a disease picture under the name of *delire de persecution* which was later named after him by his countrymen as *delire de Laséque*. In 1862 and 1865 Hoffman and Snell independently of each other gave careful attention to this subject. It was not until 1878, however, that Westphal made paranoia felt and recognized in Germany; he termed it *Verückheit* and Mendel invented the term "paranoia."

Since then the subject of paranoia has undergone many stages of transformation and variation. At one time the whole subject was in a state of confusion partly because mental diseases were incorrectly classified, partly because of deficient knowledge of the anatomy and psychology of insanity and partly due to the fact that too much stress was laid either on the symptomatologic display or etiologic foundation. It is needless to state that very little attention was paid to the disease process in all its phases, particularly in relation to the constructive development of the symptomatic picture and type of personality.

It should be borne in mind that Kraepelin in 1892 had already emphasized the fact that the paranoia group should not be looked on from the point of view of isolated symptoms, but that the whole clinical picture, including the etiology, course, duration and termination, should be considered. It was through the efforts of Kraepelin's genius and painstaking investigations that the paranoia subject assumed a more lucid scientific turn, and indeed, while the whole solution of the problem has not been completed, nevertheless our conception of paranoiac reaction types has taken a more promising view.

In the present state of our knowledge, we differentiate two large classes of paranoiac reaction types, one a paranoid symptom complex, which occurs in various toxic conditions and which may also form a part but not the dominant symptom of other types of mental disorders, for instance, a paranoid symptom may manifest itself in manic depressive insanity, hysterical psychosis, senile dementia, arteriosclerotic insanity, etc. In the other instance, the disease pictures are dominated by a paranoid symptom complex which presents various clinical manifestations in their course, such as in dementia praecox, paranoid form, paranoia, querulous paranoia and paraphrenia. The last is the subject-matter of this thesis.

GENERAL CONSIDERATIONS OF PARAPHRENIA[1]

Paraphrenia forms a subgroup of endogenous dementia and in the clinical picture delusional ideas are the predominating symptoms. In some respects it may simulate dementia praecox, but there is no characteristic disturbance of emotions and volition to such an extent as to bring about disintegration of personality. Abnormality of emotional activity, however, may be noted, but striking apathy and indifference as seen in dementia praecox are lacking, and furthermore the general conduct is influenced by abnormal thought processes and not by volitional disturbances. The etiology of paraphrenia is not definitely known and there is no specific type of heredity. It occurs in both sexes, except that the expansive form is limited to women only. The characteristic type of personality is not determined. The development is gradual; the course is progressive and the disease usually terminates in a state of psychic enfeeblement but without evidences of disintegration of personality and striking traits of emotional and volitional deterioration. Paraphrenia may be divided into four large forms: (1) systematized, (2)expansive, (3) confabulatory, and (4) fantastic.

THE TYPES OF PARAPHRENIA

1. Paraphrenia systematica is characterized by gradual development of progressive persecutory delusions and grandiose ideas, which appear in the latter part of the disease. As a rule the personality remains intact.

The onset of the disease is usually gradual—a slowly progressive change of disposition is noticed. The patient becomes quiet, reserved and dreamy. He grows secretive, seclusive and suspicious. His general conduct is odd, and occasionally he gives expression to irrational utterances. At times sensitiveness and irritability are observed. Under the least provocation he may manifest violent outbreaks and show animosity toward some persons of his environment, particularly against his relations. Not infrequently ideas of jealousy are in evidence.

In course of years the delusions of persecution become more and more marked. The patient imagines that he is being watched and followed; he expresses ideas of reference and misinterprets occurrences. He feels that people talk about him wherever he goes and thinks that detectives are sent to watch him. In fact, he feels that he is under constant observation of the police. He notices people making funny grimaces and gestures and he is the subject of trickery. In female patients sexual ideas are prominent. Likewise ideas of poisoning and delusions of being tortured are observed.

After years' duration of this painful state of suspiciousness, uncertainty and tension, actual hallucinations, particularly in the auditory field, make their appearance. The content of hallucinations varies, and inspirations and the like may occur. A feeling of influence is noted. The patient imagines he is subject to hypnotism which is employed to determine the working of his thoughts; and he believes that he is under the influence of other people's minds.

Visual, olfactory and haptic hallucinations may become manifest; women particularly experience sensations in the genital region and speak of mental sexual intercourse. Not infrequently ideas of hypnotic, magnetic and electrical influences are associated with these abnormal somatic sensations.

When in the course of many years persecutory delusions gradually and progressively become developed, ideas of grandeur set in. The latter are very rarely noticeable in the early inception of the disease or thereafter. In some instances erotic rela-

* Read before the Section on Nervous and Mental Diseases at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Kraepelin: Psychiatrie, Ed. 8, 1913, pp. 973-1022.

tions to great personages are maintained. Delusions of a religious coloring with a marked grandiose trend are seen in a small number of patients. The relationship between the delusions of persecution and the ideas of grandeur is the same as in other psychoses.

The underlying mood is mostly one of depression and apprehensiveness; the patient gradually becomes more and more suspicious, hostile and threatening. Later when delusions of grandeur develop the patient becomes self-conscious, haughty and sneering. He is seclusive and secretive, however; at times he is abrupt and inaccessible and then again he exhibits considerable politeness and is quite approachable.

The patient remains clearly oriented, and the perceptive faculty shows no impairment. Memory and retention are likewise unaffected. Falsification of memory is noted, and the patient maintains that he is persecuted since childhood and indulges in other numerous retrospective misinterpreted reminiscences.

As a rule the patient exhibits no insight into this condition, although in the early beginning of the disease he may appreciate that his situation is due to hallucinations, voices telling him that he is mentally sick, etc.

The conduct is usually influenced by the delusional content, although for some years mental adjustment may not be interrupted. Soon the disease betrays itself, however, and the patient exhibits difficulty of adapting himself to his environment. The capacity for work is retained—in fact some patients may hold responsible positions for years.

The course of this disease is insidious and gradually progressive. The condition may show some variation but to a limited degree. The disease terminates in a state of psychic infirmity with persistent delusional ideas and hallucinations but without disturbance of volition or dulling of emotions. Although the disease may last over twenty or thirty years, yet the personality remains intact.

The underlying etiology is obscure. A specific form of heredity cannot be determined. No known cause can be ascribed. A definite type of personality is not recognized by Kraepelin, though he admits that some of his patients manifested peculiar traits before the development of the psychosis. Some of his patients were sensitive, overreligious, inclined to be despondent and others were of a malicious and sadistic nature.

This form of paraphrenia occurs in both sexes: in Kraepelin's cases 60 per cent. were men and 40 per cent. women. More than 50 per cent. of cases occurred between the ages of 30 and 40; 20 per cent. of the cases developed between 40 and 50, and 25 per cent. below the age of 25 and above 50.

2. Expansive form. In this form of paraphrenia exalted ideas of grandeur with a preponderant elevated mood and mild excitement constitute the characteristic features of the disease picture.

The psychosis usually develops gradually, but at times a subacute onset may be observed. In 50 per cent. of Kraepelin's cases the grandiose ideas were of an erotic content. In another series of cases the delusions take a religious trend. In other instances ideas of wealth are prominent.

Almost always hallucinations make their appearance. The patients have numerous dream-like visions which as a rule are of a religious and erotic coloring and quite often they may be accompanied by auditory hallucinations; the latter, however, may also occur independently. Here illusions may play some rôle.

Hand in hand with the grandiose ideas, delusions of persecution may form a part of the clinical picture, which are not as prominent as in the other forms of paraphrenia.

The memory, orientation and perceptive faculty are not affected. However, falsification of memory not infrequently is observed.

The underlying mood is one of exaltation; the patients are self-conscious, haughty and quite boisterous. They are given to jesting and wit. At times they may become irritable, overbearing, arrogant and suspicious. Occasionally outbreaks of excitement occur.

The conduct is controlled by the morbid ideas and as a rule insight is lacking.

In the further course of the disease, the clinical picture slowly undergoes some changes. In general the patient remains clear and well-behaved; however, they adhere to their delusions which become somewhat absurd and rambling. Aside from faulty judgment there is a certain degree of dissociation, superficiality of emotional activity and weakness of will-power, but no true dementia. The personality is not distorted.

It is interesting to note that Kraepelin's cases were all women. Three-fourths of them developed between the ages of 35 and 50. In one of his cases the psychosis appeared at the age of 64, without, however, showing signs of senile dementia. Marked hereditary taint or external cause could not be determined. While no definite type of personality could be elicited, yet many of his patients manifested some peculiar traits prior to the development of the malady.

This form of paraphrenia may be mistaken for chronic mania and, indeed, some of these cases Kraepelin had previously included in the manic-depressive group. It is important to bear in mind that in the expansive form of paraphrenia, psychic enfeeblement invariably occurs; the excitement is relatively mild and without a history of previous attacks which would aid one in making a differentiation from manic depressive insanity.

3. Confabulatory form. In this form of paraphrenia, falsification of memory is the prominent feature in the clinical picture.

Only a limited number of cases came under Kraepelin's observation.

The development of the disease is characterized by a change in the patient's disposition. He becomes quiet; seclusive, irritable, he indulges in subtle inquiries and gradually commences to relate fantastic experiences which express themselves in delusions of persecution and ideas of reference, hallucinations and delusions of grandeur.

The delusions of persecution go back to their early childhood. For instance, the patient maintains that he was mistreated in school; that he was ridiculed by his relatives; that he was driven to masturbation; that his mother tried to poison him with an apple, and that he met people who wished to kill him; and he expresses other peculiar ideas.

The delusions of grandeur are likewise of fantastic nature and colored by falsification of memory. The patient believes himself to be a descendant from the royal family, or that he is the natural son of the king, and the like. He affirms that in school the teacher regarded him as the prince; that he was selected for the kaiser but he was too young. In such a way the patient may relate numerous fantastic grandiose adventures in the form of personal experi-

ences. Furthermore, he is capable of misinterpreting and distorting past occurrences.

The content of falsification of memory does not always limit itself to the peculiar persecutory and grandiose ideas, but it may take a retrospective trend and also find expression in the experiences the patient encounters in his daily life.

Quite often falsification of memory is associated with his immediate environment—for instance, he maintains that everything is familiar to him; imagines that he was formerly in the hospital; that nurses and patients are his old acquaintances, etc.

Sensorium is not perturbed; the patient is collected and takes cognizance of what transpires about him; gives clear and connected answers and is well-behaved. So long as his delusions do not dominate his entire personality he is clear as to his whereabouts and has good grasp on his environment.

The mood is elevated and exalted. However, transitory states of anxiety and irritability are observed. Most of the patients are loquacious and show tendency to play of words at times.

The course of the disease is progressive. "Mostly the exultant manifestations of the falsifications of memory may form a relatively short stage of the disease although the delusional fabrications continue for a longer period of time, but recurs and may possibly become more elaborated."

As time goes on the delusions become more senseless and rambling; the patient grows irritable, surly or indifferent, and finally a state of psychic enfeeblement is fully developed. As to the ultimate outcome of the clinical picture, Kraepelin cannot definitely state. Some of his cases lasted more than a decade.

This form of paraphrenia is not frequent, and Kraepelin has seen only a dozen such cases for the past thirty-five years. The two sexes may be equally affected. The disease develops between the ages of 20 and 50. No known cause could be assigned. In most cases the patient indulged in gloomy meditations long before the development of the psychosis.

4. Paraphrenia phantastica is dominated by exalted productions of marked fantastic, loosely connected, changeable delusional ideas.

Quite frequently the disease is ushered in with a depression. The patient is low spirited, dejected, anxious and expresses suicidal ideas.

Delusions of persecution gradually make their appearance. The patient imagines that he is the object of persecution, that he is under constant observation and that people talk about him. He expresses other peculiar ideas—thinks that he is to be punished for murder, larceny, etc.; imagines that he finds feces, sputum and human blood in food. Everything is drenched with arsenic, phosphorus and chloroform. Neighbors enter his room in his absence and steal clothes from him and destroy things.

Hallucinations of hearing also constitute a part of the picture. The underlying content may be threatening, persecutory, commanding, erotic or grandiose. Visual hallucinations may also occur.

Ordinary sensibility occupies an important position in the clinical picture, and on this, delusions of personal influence (*wahn der persönlichen Beeinflussung*) are founded. The patient complains of all kinds of pains and other somatic sensations in the limbs, head and chest. He also speaks of perceiving electric shocks and receiving hypodermic injections. He imagines that his scrotum is electrified; that his organs are torn out; that his voice is changed; that his whole body is transformed; that memory and his thoughts are controlled by spiritual devices, witchcraft, etc. Ideas of being hypnotized and sexual delusions are also present. Marked somatopsychic delusions of a fantastic and sexual undercurrent are often encountered—for instance, he feels that he sees men in his body—that the kaiser is in his body for the purpose of being rescued; that his father sits in his right leg; that a princess sits on his penis; that a female genital organ developed on his eye; that he consists of thirteen persons and that eight women are within him; and he expresses numerous other fantastic ideas.

In addition numerous fabrications of a fantastic nature play a rôle in the clinical picture.

Many of these delusions become cloaked in the form of falsification of memory with an underlying fantastic trend. He maintains that as a child he was robbed—that he was killed several times; that he was Christ, Eve, Moses, Alexander the Great, etc.; that he created the first people; that he studied medicine for 200 years and then again he reigned for 200 years; when he was 7 years old he ruled the world. He indulges in numerous other fabrications, etc.

The mood is slightly elevated or one of indifference. At times he may become gloomy and give vent to violent outbreaks of excitement. Irritability may also be observed, especially during longer interviews.

It is interesting to note that the patient is able to give an account of himself and answers questions to the point. His manner, however, is affected and grimaces are frequently observed. He also gives expression to senseless rhyming and play of words.

The course of the disease is progressive and gradually the utterances become confused and absurd. Neologism, very odd conduct and other eccentricities become quite marked. Emotional responses grow duller and transitory periods of violent outbreaks and irritability are of frequent occurrence. Nevertheless, many of the patients are capable of doing their work without interruption.

The rapidity of the dementia varies. In some cases it is noticeable soon after the appearance of the psychosis, within four or five years. Kraepelin knows of cases in which, aside from fantastic delusions of a peculiar confusion, he was able to demonstrate no higher grade of intellectual deterioration.

From 60 to 70 per cent. of his patients were of the male sex; on one-half of his cases the disease developed between the ages of 30 and 40, and in one-fourth below 30 and in the rest above 40. Some of his patients were of good mental endowment and of a vivacious disposition, but were inclined to indulge in subtle fancies. Others were weak-minded, stubborn and wayward. It is also interesting to note that many of his patients showed criminal propensities.

CONCLUSION

It must be admitted that the splitting up of a large heterogeneous group into subgroups with the object of restricting the disease picture to definite clinical types implies a marked advance in objective psychiatric nosology. Hence the paraphrenia group is such a welcome addition to the modern classification of mental disorders. One must bear in mind in many instances a well-defined line of demarcation between dementia praecox and paraphrenia is quite often very difficult to make; especially is this true of the confabulatory and fantastic forms. It is important to emphasize that in

V. 191

the psychopathology of dementia praecox, emotional and volitional deterioration and distortion of personality stand out quite prominently, but they are only objective landmarks to aid one in establishing such differentiations. Kraepelin lays little or no stress on the type of personality in paraphrenia or other forms of psychosis, which is so much emphasized in American psychiatry, chiefly due to the painstaking efforts of Meyer and Hoch. Should it be possible to outline a characteristic type of personality and the underlying psychologic mechanisms of a paraphrenic symptom complex our knowledge of this important group would be greatly enriched.

One cannot dismiss the subject without saying a word or two regarding the differential diagnosis between paraphrenia systematica and true paranoia. It would be recalled that the former is considered a disease process inasmuch as it has a definite onset course and termination. According to Kraepelin's[2] present conception, however, paranoia is not a disease process, but he looks on it as a peculiar psychopathic personality—"psychic malformation." The root of this condition is sought in the peculiar paranoidal anlage of the patient. The development of delusions is very slow and progressive which evolved from the personality, which at no time shows any distortion. In the clinical picture, delusions of grandeur are the foreground which result from inner conflicts and struggles, and evidently represent a fulfilment of an ungratified wish or dream.

ABSTRACT OF DISCUSSION

DR. H. DOUGLAS SINGER, Hospital, Ill.: I have studied this conception of paraphrenia by Kraepelin a good deal. I think it represents merely a way of getting out of a good many difficulties in which the system of Kraepelin's classification lands one. You will find that this particular group is composed of a number of cases which did not fit in very well in his previous classifications. Some of them represent cases which he previously classed as manic-depressive insanity with a paranoic trend. He admitted at that time that he did not know just where to place them. These have now been transferred to this group without much more justification than from that point of view. His paraphrenia phantastica represents what he called dementia paranoides in the older dementia praecox group. And this group, taken all together, really represents mental disease pictures which he has found difficult to class in any other way. He has simply put them in a separate class and attempted thereby to outline more clearly the other groups which have already been so widely accepted. I feel that all the multiplication and names and subtypes which we get in this way is a disadvantage rather than an advantage, especially when it comes to speaking of differential diagnosis between the different types. With the general conception of mental disorders which I have, in common with a good many others, I can but feel that these paraphrenic disorders again are simply individual modes of meeting situations. That in these people, who certainly present a very peculiar way of doing things, one sees a peculiar kind of personality. As Dr. Karpas says, we unquestionably will learn much more when we recognize the peculiar individual make-up which leads to these reactions. I do not feel that this represents a great advance. It is simply shelving the question of what these conditions really are and trying to maintain and define more clearly a dementia praecox disease by putting aside those cases which cannot be so clearly grouped under this conception.

DR. L. B. PILSBURY, Lincoln, Neb.: I feel as Dr. Singer does, that the newer classification has fallen into some of the faults of the old; that is, it is, as time passes, becoming more complicated, less simple in every way, less clearly defined; in fact it is becoming top-heavy. The attempt to define more clearly is what is really bringing about this complicated situation, to be sure, but the result has been simply to befog the issue rather than to clear it up.

DR. MORRIS J. KARPAS, New York: It is true that our classification of mental disorders is incomplete and imperfect; nevertheless, an objective nosologic classification is desirable, especially from the point of view of prognostic outlook. By understanding the type of personality and the underlying psychologic mechanisms of the various psychotic manifestations, much can be accomplished toward our knowledge of diagnostic groupings. It is admitted both by the synthetic and analytic psychiatrist that classification of psychoses is indispensable for the progress of psychiatry.

2. Kraepelin: Ztschr. f. ges. Neurol. u. Psychiat., 1912, xi, 617.

THE RELATION OF PATHOLOGIC CONDITIONS IN THE NOSE AND THROAT TO THE ORIGIN AND TREATMENT OF HYPERTHYROIDISM *

S. P. BEEBE, PH.D., M.D.
NEW YORK

The thyroid gland prepares an internal secretion which is not limited in its action to a single mechanism, as is the case with secretin. There is much evidence to support the belief that it acts on a wide range of tissues. Prominent among the theories of its function is that of detoxication, but the mechanism of its action in this respect is not well understood. The older theories of Notkin and Blum are no longer acceptable. The metabolic activity of the tissues in a thyroidectomized animal is below *par*. There is a lowered oxygen absorption, greater tolerance for carbohydrate, a lower body temperature and a diminished activity of both physical and mental processes. The whole picture is changed by the administration of thyroid extract. Poisonous substances which might seriously affect an animal in the abnormal condition following thyroidectomy may not be so dangerous to a normal animal or to one receiving thyroid extract; not because of a direct antagonism or neutralization of the toxin by thyroid secretion, but rather because the inactive tissues of the thyroidectomized animal are less able to protect themselves.

The experiments of Perrin and Jeandelize show that a thyroidectomized animal is more susceptible to bichloride poisoning than normal animals. Frugoni and Grixoni assert that animals with experimental tuberculosis are favorably influenced by continued administration of thyroid extract. These results are to some degree confirmed by the experiments of Marbé, who found that the phagocytic function of the leukocytes and the opsonic index of the blood are distinctly lowered by thyroid removal and stimulated by thyroid administration. Numerous clinical reports show the common belief in the diminished resistance of hypothyroid subjects to the common infections, and beneficial action of thyroid administration in such cases. Sajous has advanced the hypothesis that the mechanism of the defense against infections depends to a large degree on thyroid function.

The most complete experiments showing the antitoxic value of thyroid feeding are those of Hunt, who has found that white mice are protected from acetoni-

* Read before the Section on Laryngology, Otology and Rhinology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

tril poisoning by thyroid administration and that there is a close quantitative relationship between the amount of thyroid given and the amount of poison to which it affords protection. The protection to toxic substances evidenced by these experiments is not a universal phenomenon, however, for other animals such as rats and guinea-pigs are rendered more susceptible to acetonitril by thyroid administration, and mice which are protected to acetonitril poisoning are rendered more susceptible to morphin. Such observations indicate a marked alteration in the metabolic processes of the animal rather than a mechanism of protection.

The relation of thyroid disease to previous infections has been noted clinically by many observers. In this connection it is well to remember that thyroid disturbances occur most frequently in persons of a thymicolymphatic constitution, and it is these individuals who are most susceptible to infections. The terminal event in hyperthyroid patients is not infrequently an infection which has begun in the tonsil, and I have not seen a necropsy in these instances which did not disclose the characteristic pathology of status lymphaticus. Its most common occurrence in women and its relation to the functions of the sex-glands, such as puberty, menstruation, pregnancy and lactation, are worthy of note.

A large percentage of patients with exophthalmic goiter have enlarged tonsils and adenoids. They give a history of repeated attacks of acute tonsillitis. Not infrequently one or more of the accessory sinuses are or have been infected. It is not uncommon to date the beginning of the thyroid enlargement from a particularly severe attack of tonsillar infection.

Infections in the nose and throat are undoubtedly the most common to which the human family is subject, and with that fact in mind one so disposed might build an hypothesis relating many of our ills to that forerunner. And such a conclusion would in many instances be justified for the tonsil is one of the most important ports of entry we have for infections; but in this case the resultant condition is a hyperactivity of a gland of internal secretion and not a continued infection. It is obviously more difficult to explain such a result than to trace the connection between an acute tonsillitis and a septicemia or an infected joint. An observation of much interest in this connection has been made by Halsted. In 1888 he removed a large part of the thyroid gland from normal dogs and found that the portion remaining became hyperplastic. These experiments have been widely accepted and quoted to prove a capacity for compensatory thyroid hypertrophy, but twenty-five years later, in 1913, he repeated the experiments and found that he could no longer get the same results. In the first experiments the animals' wounds were invariably infected, while in 1913 he employed careful aseptic methods and obtained primary union. Halsted does not draw the conclusion that the wound infection causes the hyperplasia, but he recognizes that such may be the case. The relation between infection and thyroid hyperplasia has further support in the experiments of de Quervain, who found that the injection of bacterial toxins caused a marked hyperplasia similar to that produced by Bircher in rats by giving them water from goitrous wells.

The theory of the origin of thyroid hyperplasia from a specific infection has been recently reviewed and developed by Gaylord in his report on carcinoma of the thyroid in salininoid fishes. In the course of this work he studied the effects on the thyroid of rats and dogs produced by mixing with their food sediment obtained from the ponds inhabited by the goitrous fish. Such a diet produced quite remarkable thyroid hyperplasia in some of these animals; more striking, in fact, than that produced by McCarrison, who produced thyroid enlargement in goats by giving them water contaminated with the feces of goitrous men.

Infection does not in a large percentage of cases produce such an enlargement of the thyroid gland that it would be recognized as a goiter, and it may be that the thyroid does not react in this manner except in those who are not quite normal in respect to the balance of their glands of internal secretion. If the thyroid secretion is an important element in the defense against infections, it is not impossible that it is stimulated to overactivity when occasion demands, and if the stimulus be often repeated it may produce changes which we recognize as pathologic. Through the repeated stimulus to over-activity, the gland has become hypertrophied, and its heightened function continues long beyond the stimulus which called it forth. Certain experiments which I have published show beyond reasonable doubt that the discharge of iodin from the thyroid is to some degree under nerve control, but this fact does not argue against other influences working to the same end. The gastric secretion is under two influences, one nervous and the other chemical, and it is by no means unusual to find patients with a hyperactivity of the glands secreting the hydrochloric acid of the gastric juice.

Clinically there is an important relation between the infections in the nose and throat and hyperthyroidism. In patients between the ages of 16 and 24, from 35 to 40 per cent. give a history of repeated attacks of acute tonsillitis, and many of them have a chronic pharyngitis and rhinitis with enlarged tonsils and adenoids. Not infrequently one or more of the accessory sinuses is infected. It is by no means a rare thing to find that a rapid enlargement of the thyroid with characteristic symptoms of overactivity has followed immediately after a particularly severe tonsillar infection. Such patients bear these infections badly. Their convalescence is slow and each attack is accompanied by severe prostrations quite out of proportion to the seeming severity of the infection. It has been my observation that the leukocytosis accompanying these infections is lower than usually found in similar conditions in non-goitrous patients, and, although they may have the local condition characteristic of quinsy, they do not usually form an abscess which gives free pus when opened. Hyperthyroid patients often show a marked leukopenia with a relative lymphocytosis indicating some influence on the blood-picture, and this influence is evidently operative when the organism is subjected to infection.

There is no complicating factor in exophthalmic goiter which is more troublesome or more dangerous to the patient than the tonsil infections to which they are subject. Every effort should be made to prevent them. When the patient's general condition will permit, the tonsils should be enucleated and the adenoids removed. But such an operation should not be done on a patient suffering from an active thyroid intoxication without appreciation that such patients do not stand operation of any sort well, and all precaution should be taken to prevent shock from the ordeal. The methods followed by Crile in stealing the thyroid

apply quite as forcibly to operative procedure of every sort on these patients. It has not infrequently happened that the surgeon has been surprised by the unusual reaction following tonsillectomy and has found on closer examination that his patient had an enlarged thyroid with most of the symptoms of hyperthyroidism. Such an observation should precede and not follow the operation. The relief which follows the elimination of infection, whether in the sinuses, the nasopharynx or tonsil, is usually so prompt and effective that one has little doubt as to its causal relation to the overactive thyroid, and it becomes at times more important to attend to the infected areas than to attempt direct action on the thyroid. By so doing many patients will be permitted to retain their glands for a useful function.

Every young patient with an enlarged thyroid should have a careful examination of the nose and throat, and the converse is equally true. Between the ages of 12 and 20 is the beginning point of most thyroid enlargements, and it has been my observation that a combination of enlarged chronically infected tonsils and adenoids, gastro-intestinal disorders accompanied by constipation, and an enlarged thyroid with mild nervous and heart symptoms is the beginning of a condition which usually does not attract much attention unless the patient (and these individuals are nearly always young women) is annoyed by the cosmetic defect in the neck. This is the physical foundation to which such girls bring the exacting demands of school, college and social life, and under its strain a large percentage of them sooner or later fall as victims. Hyperthyroidism can be checked in such patients before any serious damage is done if the beginning is recognized. It is unfortunate that the facility with which the thyroid gland can be removed has led to many needless operations in the type of patient described.

The beginning of thyroid disease should receive more attention. Too frequently it is overlooked, and when discovered is taken lightly except in the face of quite disturbing symptoms. The progress of preventive medicine will ultimately lead to the discovery of most of these beginning cases at a time when they are easily curable with preservation of the integrity of the thyroid. Medical inspection in school and college should accomplish a great deal more in this respect than it now does.

414 East Twenty-Sixth Street.

ABSTRACT OF DISCUSSION

DR. CHARLES G. JENNINGS, Detroit: One word concerning the question of diagnosis; what symptoms will put the examiner on the track of thyroid toxemia? So far as my experience goes, there are two symptoms of the greatest value, which are easily elicited by the usual examination. They are the debility and the tremor. Both may be mild but are almost uniformly present. The question of therapeutics is largely hygienic. Rest is perhaps the most important. Girls in early adolescence, in boarding schools particularly, suffer from a mild type of the trouble and they must be given rest; social, intellectual and physical rest. The wear and tear of social functions often bring about this condition. As to medicinal treatment, my experience is that in these cases, in spite of the fact that they are cases of hyperthyroidism, the patients do well on a thyroid preparation, administered over a long period in small doses. I am in the habit of using the preparation produced by Dr. Beebe in the Cornell Laboratory. Many of these cases respond well to this remedy, combined with rest and symptomatic treatment. Occasionally quinin hydrobromid can be alternated with the thyroid preparation. There is nothing special in the diet so far as I can see, except a diet that will relieve digestive embarrassment, if that be present. Occasionally ferrous iodid seems to be valuable. Some recently published observations by Wilson and Plummer of Rochester show that this type we so frequently see is a distinct pathologic and clinical entity. Wilson calls them toxic non-exophthalmic goiter and the changes in the gland as observed by him are not those of true exophthalmic goiter. They do not develop the eye symptoms. Such cases go for ten or fifteen years with symptoms of hyperthyroidism and yet never develop characteristic exophthalmic goiter. The pathologic changes are hyperplasia, regeneration, and the formation of connective tissue, and of course this gives rise to perverted secretion. The physiologists ought to be able to help us considerably in this study.

DR. OTTO JOACHIM, New Orleans: Twenty-five years ago Fraenkel called attention in a clinical case to the reduction of goiter on the same side as that on which he reduced a hyperplastic inferior turbinate. This was looked on at that time as a very extraordinary result and not held in any causal relation. The idea was not followed up. We should be very grateful to Dr. Beebe for calling our attention more specifically to the pathologic condition following infections of the nose and throat. More strongly than ever, the theory of disturbed internal secretions advanced yesterday by Dr. Beck appeals to me. We need not look necessarily for a focus of a purulent type to explain these disturbances. A great many will be accounted for on the ground of disturbed defective or overactive internal secretions which in turn affect the thyroid.

In our part of the country we see a great deal of thyroid trouble, especially in young people, and we are often confronted with the necessity of relieving these patients without operation. I am also of the opinion that, in the earlier stages, these cases are amenable to therapeutic measures. Operation is not always indicated and the diagnosis of the beginning of the trouble is of extreme importance. The importance of these relations between abnormal conditions of the nose and throat and hyperthyroidism, however, are such that we need thorough laboratory investigations to clear up the matter. Of course, as laryngologists, we are not necessarily competent and have not always the opportunity to properly study these cases. They come to us and then disappear from our observation. The final light must come from the internist who has a better opportunity for this study.

DR. GEORGE E. SHAMBAUGH, Chicago: Dr. Beebe brings out the importance of the specialist cooperating with the internist. I emphasize this because there has been too great a tendency toward the development of special hospitals, where the eye, ear, nose and throat specialist does his work isolated from close association with other fields of medicine. The few advantages in this arrangement are far outweighed by the much greater disadvantages arising through the lack of cooperation with other branches of medicine. The best arrangement, and the one in which our best work is done, is in a general hospital, where our work is carried out in cooperation with the internist, the neurologist, the general surgeon, the dentist, etc. In the Presbyterian Hospital, in Chicago, we have been interested in this relation between hyperthyroidism and the faucial tonsils. I have several times been requested by the internist to remove the tonsil in these cases, and when asked to operate in such cases, I do so, nor do I attempt to hunt over the tonsil for palpable evidence of foci of infection before consenting to carry out the internist's request. The possibility of abnormal tonsils being the focus for the changes in the thyroid is interesting. I have several times seen the disappearance of the hyperthyroidism in a remarkably short time after the removal of the faucial tonsils. It has been suggested that the relation may be reversed. If so I do not see why the goiter should disappear after the removal of the tonsils.

DR. JOHN F. BARNHILL, Indianapolis: This subject is entirely too new to have data that is worth while. It is only in the past two years that we have been adding to our case

records, or at least that I have, the condition of each thyroid at the time of making the throat examination. Dr. Shurly recently, before the American Laryngological Society, expressed the belief that there is a relationship between hyperthyroidism, and tonsil and throat infections. Knowing that we were to have Dr. Beebe's paper, on my return home from this meeting of the Laryngological Society I looked up as many of the cases of hyperthyroidism in which I had operated for removal of the tonsils, as I could find. I found seven cases in which in the last three years I had removed the tonsils when this condition existed. In none of these cases, so far as I was able to judge, was the thyroid condition improved. One of these patients had been operated on in one of the large clinics for hyperthyroidism two years previously. The surgeon who did the operation had stated that the patient had enlarged tonsils which ought to be removed at once. When she had fully recovered from the thyroid operation I removed the tonsils. She was improved for a time. I saw this patient three days ago and the lobe of the thyroid opposite to the one which had been removed is now enlarged and she has very marked exophthalmos. This was interesting to me because one lobe of the thyroid had been removed and the tonsils had been removed, and yet she still has the condition of hyperthyroidism. I believe that there is a connection between tonsillar infection and hyperthyroidism in the same way, perhaps, as an infected toe or antrum or gall-bladder might bring about such conditions; that is, by lowering bodily resistance. It is our duty, therefore, to discover these cases early, because I am convinced from examination of the cases that I have recently made, that whatever benefit we are to get from removal of the tonsils must come from operating in an early stage of the thyroid enlargement.

Dr. Joseph C. Beck, Chicago: The subject of the infections of the upper respiratory tract in connection with thyroid disease has interested me for some time and I am in a position to speak from experience on the subject in its entirety, for I follow these cases whenever hyperthyroidism is present. Dr. Barnhill said exactly what I would say with reference to the curing of any patient with hyperthyroidism by removal of the tonsils and I have had quite an experience in that line. I have seldom seen a case that did not respond by improvement, nor have I seen a single case that was difficult to operate on. One certainly would not attempt to do a tonsillectomy in a patient in a down-grade stage of hyperthyroidism. Tonsillectomy will do this; it will do what a single ligation of the superior thyroid artery will do; it is transitory. It puts the patient in a condition in which a thyroidectomy may be done. My statement concerning the tonsils as causing hyperthyroidism is based on a study of the sympathetic nervous system. It is believed that toxic elements, not necessarily pyogenic, either stimulate or depress the vagus and alternately the sympathetic and produce changes in the internal secretions. The pathologic changes in the thyroid itself, of course, we understand, the colloid changes, which are degenerative, and have nothing to do with an infective process.

Dr. George F. Cott, Buffalo: My experience has been similar to that of Drs. Beck and Barnhill. I have operated on children of 10, 15 and 20 years of age and people as old as 69, and not a single one of these patients, thirty in number, have had any throat complaint or tonsillar or sinus trouble. So that I have reason to believe that the condition was not due to any infection of the upper respiratory tract. Dr. Beck told us what we may expect from disturbances of the internal secretions and, of course, these infections may cause disturbance of the internal secretions, but that may happen in other diseases as well as in goiter. Of all the patients I have operated on for goiter, not one complained of trouble with the throat or nose at any time. I want to make this statement from the point of view of a laryngologist as compared with that of Drs. Beebe and Jennings, and I think we have as much chance of observing these conditions as has the internist.

Dr. Owen Smith, Portland, Maine: For fifteen years I have been interested in this particular line of work. The question of diagnosis in these cases is particularly important to the laryngologist because a great many of them come to him before the symptoms become so pronounced as to attract the attention of the internist. In small cities the laryngologists are supposed to be better qualified to handle these cases than a great many of the so-called general practitioners, and they should not only be able to cooperate with the internist, but should be qualified to handle these cases both from a medical and surgical point of view.

A discouraging feature, from my observation, is that it is difficult to decide from the work of the internist and the surgeon just what is best to do in these cases; whether to treat them medically or to go on to the more radical surgical procedures. The medical treatment, in my experience, has been rather disappointing. I have followed, more or less, the work of Dr. Beebe and Dr. Forscheimer. The latter basing his work, perhaps, on the septic theory, has attained better results than in any other method of medical treatment. On the other hand, the radical surgical treatment at times is very disappointing, although sometimes the results are striking, the patient recovering rapidly.

Dr. Henry Horn, San Francisco: The propaganda of education which Dr. Beebe has presented is at this time very apropos. We, as laryngologists, possess a field of investigation which up to this time, so far as I know, has not been worked up, and inasmuch as the object of these meetings is to draw the general surgeon, the laryngologist and the internist into closer contact with our work, I desire to call attention to a problem which perhaps has not been sufficiently considered: the possibility of the tonsil as an organ of internal secretion. As specialists who remove hundreds of tonsils, we are possibly in a position to draw conclusions better than any one else, but, nevertheless, in the thousands that are removed, the opportunities for observation are seldom carried out in any systematic way. I only wish to call attention to the fact that there is a certain class of cases, especially in young women, in which removal of the tonsils will produce a condition closely related to what we know as the thyroid symptom-complex; tachycardia, intense nervousness, etc. Now, of course, that suggestion is immediately open to the objection that these cases may be cases of hyperthyroidism; I do not think so, and I think we should observe some of these cases and study them more closely with the internist.

Dr. Burt R. Shurly, Detroit: I have been much interested in this subject for five or ten years and I think there are certain points that we are very liable to neglect. Certain essential facts are necessary to be known, for in the equipment of the laryngologist certain facts of diagnosis in internal medicine are particularly valuable to us, if we can have classified knowledge and definite ideas of just exactly how we are to consider some of these problems that really belong to internal medicine and yet in which we have a great interest. In this way our equipment as laryngologists will certainly be very much improved. The great essential, it seems to me, is that we should consider an examination of the thyroid gland as part of our routine procedure in every case. A great many men will overlook the thyroid gland entirely, while if we will examine it anything of particular significance may be immediately followed up with further investigation. Dr. Beebe and Dr. Rogers of New York have certainly been the pioneers in developing this subject, and they have given us the greater part of our knowledge in this regard. Dr. Rogers has a fine history scheme which immediately concentrates one's investigation of the symptoms of thyroid trouble as it may be connected with any condition of the throat or nose. It is not claimed that diseased tonsils are the only cause of goiter. We all know that hyperthyroidism is very frequently associated with nervous shock, overwork, miscarriages and postobstetric conditions. As Dr. Jennings has said, in Michigan we have a considerable number of mild cases, and many of these are overlooked. It seems to me the prophylactic effect of removing the tonsils is quite effective. If you can prevent recurrent tonsillitis you prevent the acute condition again and it is the acute condition that makes the trouble.

V. 191

Will Dr. Jennings say something of the essentials of medical treatment?

DR. S. P. BEEBE, New York: It was not my purpose to advocate the removal of tonsils and adenoids as a cure for exophthalmic goiter. If any one has so understood my statement, I wish to correct it. What I have said about the frequent occurrence of infected areas in the nose and throat is derived from the history of approximately 3,500 patients who have had this disease. It is quite possible for one to have had a number of patients with thyroid disease who have not at the same time had either sinus or throat infections. Nevertheless such infections are a most common accompaniment of thyroid disease, and, in my judgment, constitute an important factor in maintaining a condition which favors overactivity of the thyroid gland. One cannot see the effect of repeated infections in these patients without being impressed with their importance. I wish, however, to impress the importance of making every effort to discover the beginning of thyroid disease. As specialists you will frequently be consulted by parents who bring their children to you for nose and throat infections. The patient may not have been seen by an internist at any time and, unless the physician who does see them examines the patient with reference to his general condition, as well as to determine the condition of the nose and throat, many diagnoses that might be made will be missed. Routine examinations of the nose and throat should include an examination for any possible enlargement of the thyroid gland. Simple tonsillectomy or removal of adenoids is not all that it is necessary to do in the line of treatment even in these early cases, but the custom of regarding a thyroid enlargement as of little medical importance unless accompanied by marked or severe symptoms is an error too commonly made at present. When the thyroid disease is well developed and the gland itself has undergone a marked pathologic change, there is no reason to suppose that a cure will be obtained simply by attention to the nose and throat infections. A recurrence of thyroid disease after repairing the nose and throat does not controvert the necessity for attention to such a condition. The most important thing in this work is to prevent the serious thyroid disease which has insidious beginnings, and these patients so often come to the nose and throat specialists first that it is of decided importance that the beginnings of thyroid disease should not be overlooked at a time when the patient's recovery is a comparatively simple matter.

THE USE OF CELLULOID SPLINTS IN THE TREATMENT OF DISEASES OF THE NERVOUS SYSTEM *

G. WILSE ROBINSON, M.D.
KANSAS CITY, MO.

In the treatment of diseases of the nervous system as in the treatment of other diseases, the attending physician must measure the success of his treatment by the preservation of the life of the patient and the restoration of function in the anatomic structures diseased.

Of those diseases which endanger life and disable the patient by paralyzing muscles, groups of muscles and entire members, poliomyelitis stands as the most common type. During the acute stage of this disease the patient should rest in bed, the nares should be washed with a 1 per cent. solution of hydrogen peroxid, hexamethylenamin administered, and the pains controlled by the application of heat or by the giving of analgesics, if needed, and lumbar puncture done if there be signs of meningeal irritation.

After the acute stage is passed the physician must interest himself in and direct his treatment toward the restoration of muscular function and the prevention of deformities. The restoration of muscular function can be encouraged and facilitated by massage, electricity and exercise. The paralyzed muscles should be tested with the faradic current and if they respond to faradic stimulation two weeks after the onset of the paralysis, recovery should be expected. If they do not so respond, recovery may take place if the proper treatment be instituted. The electric current which gives the best therapeutic results is the galvanic. It is the characteristic tendency of poliomyelitis to paralyze individual muscles and groups of muscles, and it is for this reason that deformities are so prone to occur.

The prevention of deformities is the most important part of the after-treatment of poliomyelitis. They occur with great frequency, and are to a much greater degree responsible for the permanent disabilities of the patient than are the paralyses. In but a small percentage of patients is the paralysis so extensive and disabling in character as permanently to prevent walking, but the deformities so cripple a large percentage of patients that walking is very difficult or impossible. General acceptance is given to the idea that paralyzed muscles should be placed and fixed in the position of rest, should not be overstretched by the action of nonparalyzed antagonistic muscles, and should be supported in order that they may be used as their condition will permit.

Numerous and various methods have been suggested by which rest, relaxation and protection of the paralyzed muscles can be secured. Simple rest in bed is considered adequate by some, others apply a splint so as to fix the limb in normal position, while others splint the limb so that the paralyzed muscles are completely relaxed and the antagonistic muscles are hyperstretched. I do not presume to say that any of these methods are bad, either absolutely or relatively. Any one of the three methods can perhaps be applied with success to individual cases.

It is my opinion that all limbs paralyzed by poliomyelitis should be fixed in the normal position of rest, so that the paralyzed muscles cannot be overstretched, and held in such position by a splint which gives sufficient support to enable the patient to walk during the stage of repair, thus applying a physiologic stimulus to aid the recovery of the affected muscles.

Contractures begin to develop early in poliomyelitis and protection should be given to the paralyzed muscles from the onset. The most common of the early deformities is toe-drop, occurring as a result of the contraction of the flexors of the toes and of the extensors of the foot, in the absence of the action of the opposing muscles. As this deformity is hastened by the weight of the bedclothes a cradle should be used when it is expected.

As soon as the pain has subsided sufficiently to enable the paralyzed structures to be handled without occasioning too much discomfort, a splint should be applied for the reasons given above.

As a material for the making of such splints I believe celluloid has many advantages. Celluloid splints are simple, effective and cheap, and most successfully meet all requirements. They keep the muscles at rest in a position of relaxation, prevent deformities and enable the patient to walk while repair is progressing. They can be worn both day and night with

* Read before the Section on Nervous and Mental Diseases at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

entire comfort, do not absorb moisture, are sufficiently strong to support an adult, and yet are very light—those for a child weighing from 10 to 14 ounces and those for an adult from 24 to 32 ounces—are readily removed in order that the limb may be washed, massaged or treated with electricity and can be reapplied without difficulty. In more than 85 per cent. of the cases the muscles of one or both legs are affected, but in about 40 per cent. they are affected in combination with the muscles of the trunk, arms and neck. In 15 per cent. of the cases the legs are not affected, but the celluloid splints can be applied to the arms, trunk or neck and perform the same functions as when applied to the legs.

CLASS OF CASES SUITABLE FOR SPLINTING

All cases of paralysis of the legs are suitable for splinting, except those with complete loss of power in the psoas and iliacus group and in the glutei. Those cases in which the back, lumbar and abdominal muscles are much affected are also unsuitable for splinting, but if there be considerable affection of the dorsal and abdominal muscles with little involvement of the legs, a spinal jacket is very helpful. The extent of the splint must vary according to the degree of the paralysis. If the leg be extensively paralyzed, the splint should encompass the entire leg as high as the tuber ischii behind, the trochanter on the outer side and the ramus of the pubes on the inner side. If the paralysis be limited to the muscles below the knee a splint reaching to the knee will suffice.

Celluloid splints have been found most useful in the treatment of the paralyses and in the prevention of the deformities of poliomyelitis, but they have a much wider range of usefulness. They are of benefit in the treatment of the wrist-drop or toe-drop associated with lead or alcoholic neuritis, or that from any other cause. They are also of value in the treatment of hemiplegia, with contraction and inversion of the foot, and in contracted conditions of the hand. They will prevent deformities if applied early in the diplegias of infancy and in myelitis.

The celluloid splint is of much value in the treatment of some conditions occurring in tabes, in hypotonia with hyperextension of the knee, they support the knees and enable the patient to walk. In Charcot's disease of the knee-joint they give support, so that the patient can walk without the danger of the knee suddenly giving way, and the fixation with pressure limits the extension of the disease and the effusion which often takes place within and around the joint. In order that the best results may be obtained the patient with Charcot's disease should rest in bed for several days before the cast for the knee is taken, so that the edema and swelling of the joint may subside, otherwise the splint will shortly be too large.

We are indebted to Calot[1] of Berck-sur-Mer for using and bringing celluloid splints to the attention of the profession. Gauvain[2] introduced them into England and used them in the treatment of tuberculous joints. To him belongs the credit of much of the improved technic in making them. Dr. Frederick Batten[3] of the National Hospital for the Paralyzed and Epileptic, and of the Great Ormond Street Hospital for Sick Children, London, proved their great value in the treatment of poliomyelitis and other diseases of the nervous system. Dr. Batten, relative to his experience with them, says[4]: "I have used them frequently during the past two years in the treatment of cases of poliomyelitis, and they have proved of the greatest service in preventing deformity and hastening recovery."

1. Calot: Orthopédie Indispensable, Paris, 1913.
2. Gauvain: Brit. Med. Jour., 1913, i, 1200.
3. Batten, Frederick: Lancet, London, 1912, i, 80.

MAKING THE SPLINTS

The following processes are involved in making the splints:

1. The taking of the negative cast of the part to be splinted.
2. The making of the positive cast from the negative.
3. The building of the splint on the positive cast.

The details of these three processes are to be given, but I desire to emphasize the importance of the first process. The negative cast should be applied by the physician and it is essential that it be made properly, otherwise it will be useless.

THE NEGATIVE CAST

For the purpose of making the negative cast the following articles are required: a strip of lead ¾ inch wide and 2 or 3 feet in length, some oil, a strong knife with a sharp point, and some plaster-of-Paris bandages. For this purpose the ordinary surgical bandages are really not suitable. Batten recommends a bandage made of book-muslin, 4½ inches wide and from 4 to 6 yards in length, loosely wound and not too heavily loaded with plaster.

The part of the body of which the cast is required is first shaved, if hairy, and then oiled. The strip of lead is oiled and adjusted to the point at which the cast is to be opened. The limb is now placed and held in the position in which it is to be fixed by the splint. As stated above, one of the most important functions performed by a splint to a disabled leg is to enable the patient to walk during the process of repair. If the leg be splinted with the knee hyperextended and the foot dorsiflexed on the tibia, walking will not be possible. The knee should be slightly flexed and the foot held exactly at right angle with the tibia. The plaster-of-Paris bandages are placed in warm water and after being squeezed out are wound round the limb, starting at the periphery and working up. The best results will be obtained if each bandage is taken continuously from one extremity of the cast to the other. If this be done the tendency of the cast to crack transversely will be much lessened. It is not necessary that the cast be very thick; four or five bandages for the entire leg of a child from 6 to 8 years old will be ample. The plaster will usually set in from three to five minutes. After it has set sufficiently a cut is made down to the lead. Before manipulating the cast be sure that all threads are divided, or a portion of the cast may be pulled out of place and the cast spoiled. The cut edges of the cast are now separated and the lead removed through the incision; the edges are still further separated and the cast is gently removed from the limb. In the case of the leg, if an assistant will grasp the toes and pull them forward while the cast is pushed backward little difficulty will be experienced.

After the removal of the cast the cut edges are carefully approximated and a single layer of plaster bandage wound round the cast from one end to the other, the lower opening being carefully closed with the bandage. This completes the negative cast and it is laid away to dry.

4. Batten, Frederick: Clin. Jour., 1913, xlii, 5.

THE POSITIVE CAST

The time required for the negative cast to dry is from twelve to twenty-four hours; after it has thoroughly dried the positive cast may be made. The inner side of the negative cast is well oiled; a bamboo cane or small stick of wood of adequate strength to support the positive cast and several inches longer than the negative cast is placed down the center. The plaster-of-Paris is now mixed in the usual manner, poured into the cast and allowed to stand for about twelve hours. An incision is made through the single layer of plaster bandage, the cut edges of the negative cast separated and the positive cast removed. The positive cast is now ready for the molding of the splint.

THE MOLDING OF THE SPLINT ON THE POSITIVE CAST

As previously stated, to build the splint on the positive cast is not a difficult process and may be done equally well by the physician or nurse. The various articles required are as follows: stockinet or thin felt, gauze or book-muslin, solution of celluloid in acetone ("Gauvain's solution"—11 ounces of celluloid to 160 ounces of acetone, to which is added 3 ounces of calcium chlorid dissolved in 2 ounces of hot water, which should be added to the celluloid solution while still hot and well shaken), celluloid varnish (cellulose triacetate one part, acetone five parts), some leather for binding the splint and some boot-hooks.

METHOD

A layer of stockinet or felt is sewn over the positive cast. Over this is placed a layer of gauze or book-muslin, so cut as to conform to the shape of the cast. On this is painted a coat of the celluloid solution; another layer of gauze is applied, on which is painted another coat of celluloid solution; this process is repeated until from twelve to eighteen coats of celluloid solution are painted on as many layers of gauze, the number varying with the age of the patient and the character of the part to be splinted. Sufficient time should be allowed between the application of the successive coats of celluloid for the previous coat to dry. A few extra layers should be applied about the knee and ankle. After the final coat has dried a layer of celluloid varnish is applied. Two incisions are now made about ½ inch apart and a strip of the splint removed at the point at which the opening is to be made. This permits of the removal of the positive cast from the interior of the splint. The splint is now ready to be fitted to the patient. It should fit perfectly, assuming that the cast was well made. It is usually necessary to cut away a small amount of the splint around the knee and ankle in order to facilitate its removal and reapplication.

After the fitting process is completed, the edges of the splint are bound with leather and boot-hooks are inserted. It is now ready for wear. The splint should be worn next to the skin as a stocking inside will force it out of place. It should be applied while the patient is still in bed, laced on and worn day and night, being removed twice a day for massage and passive movements. If it causes discomfort by undue pressure at any point, it should be stretched and manipulated so as to relieve the pressure. If relief cannot be obtained in this manner, some of the splint should be cut away rather than to put wool or leather inside the splint to relieve the pressure.

It is desirable that the patient be up and walking as soon as possible after the onset of the disease. Aided by the splints the average patient can walk at the end of the first month, without liability to deformity. A walking apparatus is usually necessary at first but many patients regain strength so rapidly that they are soon able to walk alone. A slipper or shoe should be fitted and worn over the splint, as walking is thereby made easier. Some patients with poliomyelitis recover so rapidly that the splints are no longer needed after a few months, while others may need to wear them even up to two years. If walking is not possible without support at the end of this time, a metal brace should be applied when the splints are discarded. In some cases of this disease there is never sufficient restoration to enable the patient to walk without some support. In those cases a metal brace will answer better after the splints have served their purpose.

CONCLUSIONS

Many patients with poliomyelitis are permanently disabled because of deformities. Celluloid splints prevent the deformities and aid in the recovery of the paralyzed muscles. They render the same aid in many other forms of paralysis and by affording support they give much comfort and greatly increase the efficiency of the patient with a Charcot joint and in extreme cases of hypotonia of tabes.

937 Rialto Building.

ANAPHYLAXIS FOLLOWING SKIN-GRAFTING FOR BURNS

H. L. UNDERWOOD, M.D.
LA GRANDE, ORE.

The case herewith reported is of interest, partly because perfect recovery followed, notwithstanding the extent of the burn and its systemic effects, and partly for the occurrence of certain phenomena analogous to if not identical with anaphylaxis. To quote Auer,[1] "While the investigator should be alert to note resemblances of reaction in the different species, he should be still more alert to discover new types of reaction." So far as I am aware there has been no effort to identify the reaction accompanying repeated skin-grafting over large areas with that of anaphylaxis, yet it seems clear that they are closely related if not identical, as the following case indicates:

History.—G. H., man, aged 25, driver, gave no evidence or history of constitutional disease of any kind. On the night of Nov. 14, 1910, he was burned by the explosion of a kerosene lamp. When seen by me shortly after the accident he was suffering acutely and presented burns from head to the knees with the charred night-clothes adherent to the flesh. The areas burned were: face, scorched but not blistered; neck, blistered and skin above right clavicle destroyed over an area of several square inches; right shoulder burned to third degree; right arm burned to third degree over two thirds its surface; right forearm burned to a blister; both hands badly blistered; all the right side and nearly half of the left side of the thorax burned badly, nearly all to third degree; about one-third of the entire back blistered, about one-third to the third degree; abdomen and groin on the right side burned to third degree, on left side, scorched; right hip blistered; right thigh, third degree burn over its inner aspect; external genitals completely blistered; left thigh, third degree burn over one-fourth inner surface; extensive areas burned to

1. Auer, J., in Forchheimer's Therapeusis, v.

large blisters over both thighs; knees, legs and feet free. I estimated that fully half of the surface of the body was affected.

Treatment.—Temporary dressings with moist compresses of sodium bicarbonate were applied and an opiate given. Next day Nietsche's oil varnish was applied: lead oxid 1 part, linseed oil (boiled) 25 parts, salicylic acid 5 parts. The diet, for one month, was restricted to fluids. High rectal enemas were given once or twice daily. Digitalis and strychnin were given when the pulse indicated it. Skin-grafting was begun as early as the local condition warranted, skin being employed from the patient's brother, and later from friends and neighbors. In all grafting was done at twenty-two sittings and skin was furnished by seventeen different persons. The dates of the earlier grafts are as follows: November 26, 30, December 5, 9, 10, 11, 12, 13, 14, 15, 17. These earlier grafts took readily and throve but just about the last date mentioned trouble began. An area about 6 inches square was grafted and did not take; then some of the old grafts began to "melt." Succeeding grafts also failed. Over a large area of the left thigh and back where no grafting had been done but autogenous epitheliation had progressed well, the tissue "mushed" and oozed blood badly. Hematuria appeared and lasted two days, and the heart impulse became irregular and weak. An examination of the blood, stained with eosin and methylene blue, showed distinct purplish granules in the red cells in enormous numbers. No blood-count was made, but there appeared to be a diminution per field in the white cells.

Having in mind some previous experiences with surgical wounds reopening coincidently with malarial attacks, I administered quinin for a few days although I could elicit no history of malaria. The patient's temperature rose irregularly in spite of rectal irrigations and laxatives till it reached 102, and 103 F. Pulse was 100 and regular.

Urine examination was negative for pus and albumin. Once or twice soon after the blood disappeared from the urine, the cold nitric acid test elicited the secondary ring, which disappeared on warming.

Egg grafts were next tried (December 24), and at first took well. The first was applied to the groin, and scarlet red used to stimulate a take. This I used in 8 per cent. ointment with boric acid or dusted in pure powder on the grafts and wound margins with the best results throughout the remainder of the case, and I attribute the good result attained partly to its use.

Egg grafts were repeated December 27, 28 and 31, January 2 (when the temperature rose to 100.3) and also January 7, 9 and 15. January 23 I ventured again to use a human graft, this from the patient's sister. A temporary take occurred but did not thrive well enough to offer much encouragement. The only human graft which throve thereafter was a very small one from the patient's mother. The egg-grafts failed after the first few times and thenceforth I relied mainly on scarlet red and the patient's own powers of epithelization. It was remarked both by the patient and myself that the application of the later egg-grafts caused very profuse secretion which fairly floated them off at the end of forty-eight hours, however carefully applied, and simultaneously the patient's own epithelium appeared to be stimulated to unusual proliferation.

It might be inquired why I made the attempt to skin-graft a score of small areas rather than a few large ones. I did so partly because not all the areas were in suitable condition at once and also because none of the patient's friends could afford to be laid up, but there were many who would give a little skin under local anesthesia with ethyl chlorid. Further, when the early successful grafting was interrupted by sudden and prolonged failure and disaster described above, I feared to continue except tentatively and on a small scale. In the light of present knowledge of anaphylaxis it is probably advisable to do the grafting in as few operations as possible and conclude the work within a few days. This, too, in the case of extensive burns may be dangerous to the patient. The problem, in fact, is one of great difficulty. Desensitization seems to be possible experimentally and may become so practically. There is still much to be learned in the realm of anaphylactic reaction before we can solve the problems that face us.

One important feature of sensitization is that it may be inherited, Rosenau and Anderson having shown in 1906 that the female guinea-pig may transmit her acquired susceptibility to her young. I know of no evidence that this holds in case of the male parent.

The anaphylactic reaction is more accentuated in proportion as the species concerned are widely separated biologically. Thus Rosenau and Anderson report that guinea-pigs sensitized with egg-white from the hen react to a later injection of the white from a duck's egg, but the reaction is less marked than when horse-serum is used. Further, the discovery of organ specificity by Wolff-Eisner in 1904 opens new difficulties. He found that the guinea-pig may be sensitized by an extract of the lens of its own eye and will react later to an injection of extract of the lens of the other eye, while organ-extracts from other animals easily sensitize.

In the case here reported it is to be noted that not only did two sets of foreign tissue successively lose their power to be transplanted, but also in each case caused distinct reaction in the patient. Yet at the same time, grafts from the patient's sister took to a degree and one from the mother perfectly. One may infer that consanguinity has a favorable influence.

The active immunity acquired in the course of an infectious disease or through the administration of specific vaccines possibly affect the blood so as to permanently influence the reaction of the body toward foreign proteins. Purpura hemorrhagica following an acute infective fever may perhaps be a manifestation of anaphylaxis. In 1901 I reported[2] such a case of purpura of severe type following an attack of lobar pneumonia in a child aged 4. In that case the pneumonia began February 6 with a definite crisis on the tenth day followed by convalescence. The purpura began March 2 without fever or any symptom of a new infection or recrudescence of the old one. The temperature by March 12 had risen to 101 F., and the blood showed marked evidence of hemolysis. The hemorrhages were profuse and prolonged, involving both the skin and mucous membranes. Was the purpura a secondary infection, or a slowly developing lack of prothrombin or other essential blood-clotting element of the blood, or was it some sort of anaphylactic reaction? My experience thus far leaves me in doubt. One practical lesson from the burn case herewith reported would seem to be that scarlet red and stimulation of the epithelium of the individual are of prime importance.

The patient was under constant care for nine months, but to my gratitude and somewhat to my surprise made a perfect recovery without contractions or impaired motion and no appreciable scars.

Necessity for Vital Statistics.—Sound vital statistics are the fundamental basis of all public health work, and should be the fundamental basis of public health laws. A nation that does not provide for accurately registering the births of its children and the deaths of its citizens, places a low value on human life, and could hardly be supposed to attach much importance to the conservation of human life.—W. F. King, M.D., in *Jour. Indiana State Med. Assn.*

---

2. Underwood, H. L.: Am. Med., Oct. 19, 1901.

Special Article

TWELFTH ANNUAL SUMMARY OF FOURTH OF JULY INJURIES

This week, for the twelfth consecutive year, THE JOURNAL presents statistics of deaths and injuries resulting from the celebration of the Fourth of July, with particular reference to tetanus, or lockjaw resulting from these injuries. With the rapid decline in the number of casualties in the last few years, instead or relaxing its vigilance, THE JOURNAL has made extra effort to secure complete and accurate data. As usual during the last few years, a large majority of the blanks were returned from the hospitals with the statement that no cases were treated. From others only a few names were reported, whereas in previous years several pages were required to contain the lists. Our thanks are extended to health officers, hospital superintendents, physicians and others for the careful reports which have made these statistics practically complete and the figures fairly reliable. The data are presented in the same manner as heretofore so that the comparison with the figures of previous years may be made.

TABLE 1.—CASES OF TETANUS

Name	Sex	Age	Cause of Wound	Site of Wound	Duration in Days*		Day Antitoxin was used	Termination
			KENTUCKY					
Wollborn	M	13	Bl. etg.	Hand	(7)	10	9	Death
			MINNESOTA					
Peck	M	14	Firearms	Knee	.....		.....	Death
			NEW JERSEY					
Jarvis	M	10	Bl. etg.	Hand	(6)	8	.....	Death

*Figures in parentheses show incubation period.

TABLE 2.—TETANUS CASES BY STATES
Comparison with Previous Years

	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
Alabama	..	..	1	..	..	..	..	..	..	..	..	..
Arizona	..	..	..	..	1	..	..	..	..	..	..	..
California	2	4	4	8	1	..	2	1	2	1	..	..
Colorado	4	..	1	..	..	..	..	..	..	..	..	..
Connecticut	3	..	3	..	4	1	..	..	..	..	..	..
Delaware	..	..	1	1	1	..	2	..	..	..	..	..
District of Columbia	1	..	..	..	..	..	..	..	..	..	..	..
Florida	..	..	..	..	..	..	1	..	..	..	..	..
Georgia	..	..	..	..	1	..	..	..	..	..	..	..
Idaho	1	..	..	..	..	..	1	..	..	..	..	..
Illinois	49	45	20	16	12	12	20	10	3	..	..	..
Indiana	11	6	3	8	2	..	9	6	..	1	..	..
Iowa	14	2	3	4	4	1	1	1	1	..	..	..
Kansas	11	1	..	..	2	1	6	..	..	..	1	..
Kentucky	4	2	..	1	..	1	1	..	..	..	..	1
Louisiana	..	..	..	..	..	..	..	..	..	..	..	..
Maine	2	4	1	1	..	1	1	1	..	..	..	..
Maryland	1	..	1	1	..	..	2	1	..	..	..	..
Massachusetts	16	5	7	3	2	5	8	..	1	1	..	..
Michigan	28	7	9	4	4	2	11	11	2	1	..	..
Minnesota	15	2	2	2	2	..	..	..	..	..	..	1
Missouri	29	1	3	3	1	5	8	2	..	..	..	..
Montana	2	1	1	..	1	..	3	2	..	..	..	..
Nebraska	4	3	3	1	..	1	3	1	..	..	..	..
New Hampshire	2	..	..	1	..	..	1	..	..	..	..	..
New Jersey	8	9	2	10	8	10	19	9	2	..	..	1
New York	33	9	6	8	4	9	11	7	1	..	2	..
North Dakota	..	..	..	..	..	..	..	..	..	..	..	..
Ohio	67	9	5	5	6	7	12	3	3	..	..	..
Oklahoma	1	..	1	1	..	1	..	1	..	1	..	..
Oregon	2	..	..	1	1	1	..	..	..	..	..	..
Pennsylvania	82	17	12	5	7	7	10	11	1	..	..	..
Rhode Island	3	..	..	1	..	..	..	..	..	..	..	..
South Carolina	..	..	..	..	..	..	..	..	..	..	..	..
South Dakota	..	..	..	..	..	1	1	..	..	..	..	..
Tennessee	..	..	..	..	..	..	..	..	..	..	..	..
Texas	..	..	..	..	2	..	..	..	..	..	..	..
Utah	..	1	1	..	..	..	1	..	..	..	..	..
Vermont	3	2	..	2	2	..	..	..	..	..	..	..
Washington	2	1	..	..	2	4	4	1	..	..	..	..
West Virginia	2	..	..	2	..	1	4	..	..	2	..	..
Wisconsin	10	4	13	2	3	5	9	3	2	..	..	..
Wyoming	..	..	..	1	..	..	..	..	..	..	..	..
Total	417	165	134	89	73	76	150	72	18	7	4	3
States having cases	30	21	22	25	23	20	25	18	10	6	3	3

FEWER CASES OF LOCKJAW

Only three cases of tetanus were reported this year as compared with four cases last year, seven cases in 1912, eighteen in 1911, seventy-two in 1910 and 150 in 1909. The returns this year are quite encouraging and give hope that deaths from this needless cause will soon cease.

The ages of the three lockjaw patients this year were 14, 13 and 10 years, respectively, and all were boys. In two cases the injury was on the hand and in the other on the knee. The length of time between injury and death was eight days in one and ten days in another. In the third case the dates were not given by which the time could be computed. The figures in parentheses (Table 1) give the number of days between the time of injury and the appearance of the active symptoms of tetanus, this being in six and seven days, respectively. Antitoxin was used in one case but not until the day after the active symptoms had appeared, which is usually too late. The list of tetanus cases is given in Table 1.

TABLE 3.—RATIO OF TETANUS CASES TO BLANK CARTRIDGE INJURIES

Year	Tetanus Cases	Blank Cartridge Injuries	Ratio
1903	417	1,672	1 : 4.27
1904	165	953	1 : 5.62
1905	104	809	1 : 7.78
1906	89	979	1 :11.60
1907	73	606	1 : 8.16
1908	76	942	1 :12.39
1909	150	1,225	1 : 8.17
1910	72	450	1 : 6.25
1911	18	185	1 :10.28
1912	7	75	1 :10.71
1913	4	97	1 :24.25
1914	3	122	1 :40.67
Totals	1,118	8,067	1 : 7.22

TABLE 4.—CAUSES OF TETANUS CASES

Year	Blank Cartridge	Giant Cracker	Cannon	Fireworks	Powder, etc.	Total
1903	303	17	5	3	29	417
1904	74	18	5	1	7	105
1905	65	17	4	5	13	104
1906	54	17	1	7	10	89
1907	52	8	6	4	3	73
1908	58	5	4	3	6	76
1909	130	9	1	4	6	150
1910	64	2	..	..	1	72
1911	15	1	1	..	1	18
1912	7	..	..	..	..	7
1913	4	..	..	..	..	4
1914	2	..	..	1	..	3

DISTRIBUTION OF TETANUS

The tetanus cases by states are shown in Table 2. Cases occurred in only three states this year, no case being in any of the states which reported cases last year. There were cases in six states in 1912, ten states in 1911, eighteen states in 1910 and twenty-

five states in 1909. One case each occurred in Kentucky, Minnesota and New Jersey. The clearing up of deaths from this cause in the last few years as shown by Table 2 is really marvelous.

THE DEADLY BLANK CARTRIDGE

Blank-cartridge wounds, which have always been responsible for a large majority of tetanus cases, this year caused two of the three cases, the other case resulting from a gunshot wound.

TABLE 5.—CASES OF TETANUS FROM OTHER CAUSES

	1908	1909	1910	1911	1912	1913	1914
Alabama	..	..	1	1	..	..	..
Arizona	..	..	..	..	..	1	..
Arkansas	2	..	..	..	..	..	..
California	4	4	1	2	7	10	..
Colorado	3	..	..	1	..	..	..
Connecticut	2	2	..	..	..	..	..
Delaware	2	1	..	..	..	..	..
District of Columbia	..	..	..	..	..	..	..
Florida	2	..	..	..	..	..	..
Georgia	..	1	..	..	..	..	..
Idaho	..	..	..	..	..	..	..
Illinois	17	18	7	6	10	7	..
Indiana	6	4	1	2	1	2	1
Iowa	2	7	3	1	..	2	1
Kansas	4	..	1	..	..	..	..
Kentucky	5	5	..	1	2	..	3
Louisiana	1	..	..	1	3	2	..
Maine	..	..	..	..	..	..	..
Maryland	3	..	2	1	1	..	..
Massachusetts	3	5	..	..	..	..	..
Michigan	4	3	1	..	..	..	1
Minnesota	4	6	..	..	..	..	..
Mississippi	..	..	..	..	..	..	..
Missouri	12	5	1	2	3	..	..
Montana	..	..	..	..	..	..	..
Nebraska	..	3	1	1	1	..	..
Nevada	..	..	..	..	..	..	..
New Hampshire	..	..	..	..	..	..	..
New Jersey	7	8	8	1	..	..	3
New Mexico	..	1	..	..	..	..	..
New York	17	12	4	2	4	..	2
North Carolina	1	..	..	..	..	1	..
North Dakota	1	..	..	..	..	..	..
Ohio	23	13	2	..	2	1	3
Oklahoma	..	..	..	..	..	..	..
Oregon	..	1	3	..	2	..	..
Pennsylvania	21	21	8	6	4	1	2
Rhode Island	..	1	..	..	..	..	..
South Carolina	..	..	..	..	..	..	..
South Dakota	2	2	..	..	..	..	..
Tennessee	3	..	..	..	1	1	..
Texas	4	1	1	..	..	..	..
Utah	..	..	..	..	..	..	..
Vermont	..	..	1	..	..	..	..
Virginia	4	1	..	1	2	1	..
Washington	2	..	..	..	1	..	..
West Virginia	..	1	..	..	..	..	..
Wisconsin	5	4	1	..	..	1	..
Wyoming	..	..	..	..	..	..	..
Totals	166	128	47	29	41	32	16
States reporting cases	29	25	18	15	15	12	8

As may be noted, on comparison of the statistics of this year with those of previous years (Table 3), there is a significant ratio each year between the number of tetanus cases and the number of blank-cartridge wounds. The large increase of injuries from this cause in 1909 resulted in a corresponding increase in the number of cases of tetanus. A reduced number of blank-cartridge wounds almost invariably brings also a smaller number of lockjaw cases. The smaller number of tetanus cases in recent years in proportion to the blank-cartridge injuries is doubtless due to the greater care in treating wounds from this cause and the more common and prompt use of tetanus antitoxin.

TETANUS FROM INJURIES NOT CAUSED BY FIREWORKS

Besides the cases of lockjaw due directly to the use of fireworks, it is interesting to note those occurring during Fourth of July season which were due to penetrating wounds from other causes, such as nails, splinters, crushing injuries, etc. There was a continued reduction in these cases this year, only sixteen cases being reported as compared with thirty-two cases last year. Tetanus germs were perhaps as prevalent as in previous years, the reduced number of cases from these other causes being likewise due doubtless to the more common use of tetanus antitoxin.

OTHER DEATHS AND INJURIES FROM FIREWORKS

Besides the three deaths due to tetanus, thirty-seven persons were killed by various forms of fireworks, making a total of forty deaths, or eight more than last year, one less than in 1912, seventeen less than in 1911 and ninety-one less than in 1910. Although the number is low compared with previous years, still the increase over last year indicates a possible relaxation in the enforcement of the restrictions of last year. This year five persons were killed outright by firearms, six by explosions of powder, bombs or torpedoes, four by cannon and five from blood-poisoning, from rockets, or other forms of fireworks. The most serious fact presented this year is that sixteen persons, mostly little girls or small children, were burned to death by fire from fireworks, three of these being reported as due to supposedly harmless sparklers!

As heretofore, all accidents not due directly to the discharge or handling of fireworks or other means of noise production and display on or about the Fourth of July have been omitted. Table 6 shows a comparison of the causes of death aside from tetanus for the past ten years.

DISTRIBUTION OF INJURIES

In Table 7 a summary of all injuries, including tetanus, and of all causes, is given arranged by states. Beneath the totals at the bottom are given, for comparison, the totals for the eleven previous years and the grand totals for the twelve years. Table 8 permits the comparison by states of the total deaths and injuries for eleven years. The number of casualties

TABLE 6.—CAUSES OF DEATHS NOT DUE TO TETANUS

Year	Gunshot	Fire from Fireworks	Powder, Torpedoes, etc.	Giant Crackers	Cannon	Other Causes	Total
1905	37	23	6	5	7	17	95
1906	38	18	18	3	3	3	83
1907	30	31	13	13	3	22	102
1908	30	27	19	23	7	7	108
1909	17	37	16	7	7	6	90
1910	19	26	11	2	3	3	64
1911	11	12	9	2	5	8	47
1912	9	8	7	2	2	7	35
1913	8	13	6	..	1	1	29
1914	5	16	6	1	4	5	37
Totals	194	206	111	58	42	79	690

this year was 1,506, *an increase* of 343 over last year and *an increase* of 518 of the casualties reported for 1912. This increase is seen in the majority of states. Pennsylvania had 487 casualties this year, a decrease of only 4 cases below last year but an increase of 222 cases over the number reported in 1912. New York had 250 casualties, or almost double the number reported last year. Illinois reported 95 cases this year, which is more than twice as many as last year, although it is still a great reduction below the enormous totals annually reported prior to 1912. Massachusetts and Connecticut reported, respectively, 87

and 77 cases this year, the largest totals in those states since 1910. The figures for the last three years are very small compared with the previous years for California, Indiana, Iowa, Missouri, New Jersey, Ohio and Wisconsin. Continued reductions are seen this year only in Missouri, Nebraska, Ohio and Washington. Pennsylvania still leads in having by far the largest number of casualties. Meanwhile, of the 487 casualties in Pennsylvania, 241 (about half) were reported from Philadelphia this year as compared with 340 in that city in 1913.

NATURE OF NON-FATAL INJURIES

There were 1,466 non-fatal injuries this year, or 335 more than last year and 519 more than 1912. Three persons were totally blinded this year, thirteen lost one eye each, sixteen lost legs, arms or hands, and sixty-seven lost one or more fingers. As there has been a considerable increase in the total number of non-fatal injuries, so have the totals of these more severe injuries been increased. This year 402 injuries were due to the giant firecracker, which continues to hold the first place as a cause of lacerated wounds and was responsible for most of the losses of eyes, hands, and fingers. A surprisingly increased number of injuries were caused by firearms this year, 231 cases being reported including five deaths. As usual, many of these injuries were caused by stray bullets from the reckless use of firearms by other persons. The use of cannon, including many of the improvised

TABLE 7.—SUMMARY BY STATES OF FOURTH OF JULY CASUALTIES

Marginal Number	States	Deaths			Injuries						Total Persons Dead or Injured	Causes of Tetanus Cases		Causes of all Cases Aside from Tetanus Cases				Marginal Number
		From Tetanus	From Other Causes	Total	Loss of Sight	Loss of One Eye	Loss of Leg, Arm or Hands	Loss of Fingers, One or More	Other Injuries	Total Non-Fatal Injuries		Blank Cartridge	All Other Causes	Blank Cartridge	Firecracker	Cannon	Firearms	Powder and Fireworks	
1	Alabama								1	1	1				1				1
2	Arizona		1	1							1								2
3	Arkansas																		3
4	California					2	1	2	19	24	24			1	10	3	4	6	4
5	Colorado								3	3	3				2			1	5
6	Connecticut							4	73	77	77			21	8	13	14	21	6
7	Delaware								8	8	8				6		1	1	7
8	District of Columbia					1				1	1							1	8
9	Florida																		9
10	Georgia																		10
11	Idaho							1		1	1						1		11
12	Illinois		6	6		2		7	80	89	95			7	27	10	11	40	12
13	Indiana		2	2				2	58	60	62			1	19	3	11	28	13
14	Iowa		2	2				1	24	25	27				16	2		9	14
15	Kansas				1				6	7	7				1	4		2	15
16	Kentucky	1		1				2	8	10	11	1			4		3	3	16
17	Louisiana								4	4	4				2		1	1	17
18	Maine								6	6	6				2	1		3	18
19	Maryland							1	9	10	10				2	3	4	1	19
20	Massachusetts		2	2			3	2	80	85	87			6	27	4	7	43	20
21	Michigan		1	1	1	2		6	62	71	72				29	9	3	31	21
22	Minnesota	1		1		1		1	9	11	12		1	3	2		1	5	22
23	Mississippi																		23
24	Missouri		1	1			1	4	47	52	53				19	3	14	17	24
25	Montana							1		1	1							1	25
26	Nebraska								10	10	10				5	1	2	2	26
27	Nevada																		27
28	New Hampshire								15	15	15			1	5	3	2	4	28
29	New Jersey	1		1		1	2	2	49	54	55	1		5	4	4	19	22	29
30	New Mexico																		30
31	New York		6	6		3	2	11	228	244	250			39	65	23	63	60	31
32	North Carolina																		32
33	North Dakota																		33
34	Ohio		1	1				4	40	44	45				19	6	6	14	34
35	Oklahoma		1	1					3	3	4				1		2	1	35
36	Oregon								5	5	5				1			4	36
37	Pennsylvania		9	9	1	1	5	15	456	478	487			29	103	44	48	263	37
38	Rhode Island		1	1					24	24	25			6	5	2	5	7	38
39	South Carolina																		39
40	South Dakota								1	1	1							1	40
41	Tennessee								1	1	1						1		41
42	Texas																		42
43	Utah						1			1	1							1	43
44	Vermont								3	3	3			1			2		44
45	Virginia					1		1	3	5	5			1		1	1	2	45
46	Washington		2	2					3	3	5			1	2		1	1	46
47	West Virginia								8	8	8				2	4	1	1	47
48	Wisconsin		2	2					21	21	23				13		1	9	48
49	Wyoming																		49
50	1914 totals	3	37	40	3	13	16	67	1,367	1,466	1,506	2	1	122	402	143	231	605	50
51	1913 totals	3	29	32	2	22	10	46	1,051	1,131	1,163	4	0	97	312	62	169	519	51
52	1912 totals	6	35	41	8	21	13	43	862	947	988	7	0	70	302	75	157	317	52
53	1911 totals	10	47	57	8	26	30	83	1,200	1,346	1,403	15	3	170	484	114	184	633	53
54	1910 totals	67	64	131	7	33	26	114	2,612	2,792	2,923	64	8	386	1,050	212	229	974	54
55	1909 totals	125	90	215	16	36	41	176	4,823	5,092	5,307	130	20	1,095	1,614	427	341	1,680	55
56	1908 totals	55	108	163	11	48	57	184	5,115	5,404	5,623	58	18	816	1,703	390	481	2,058	56
57	1907 totals	62	102	164	12	75	57	227	3,908	4,249	4,413	52	21	554	1,480	367	502	1,558	57
58	1906 totals	75	83	158	22	72	56	227	4,881	5,308	5,466	54	35	925	1,640	408	522	1,822	58
59	1905 totals	87	95	182	25	106	60	221	4,562	4,964	5,176	65	39	744	1,775	474	404	1,675	59
60	1904 totals	91	92	183	19	61	61	268	3,637	3,986	4,169	74	257	831	1,368	508	498	1,057	60
61	1903 totals	406	60	466	10	75	54	174	3,670	3,983	4,449	363	294	1,309	1,152	397	736	363	61
	Total for twelve years	990	842	1,832	143	633	501	1,780	37,897	40,954	42,786	888	199	7,119	13,391	3,486	3,872	13,831	

* Kind of fireworks causing six tetanus cases unknown. † Kind of fireworks causing 24 cases of tetanus unknown.

variety, resulted in 143 injuries this year, including four killed. In the twelve years, a total of 42,786 persons—the equivalent of over forty regiments—were killed or injured in the celebration of the Fourth of July.

TOTALS IN CHIEF CITIES

Table 9 shows the number reported killed and injured in our largest cities each year and the totals for the past eight years. The cities are arranged according to their population as given by the United States census in 1910. This table is of particular interest, since the results in each city in which prohibitive or restrictive ordinances have been adopted

TABLE 8.—TOTAL DEATHS AND ACCIDENTS BY STATES DURING ELEVEN YEARS

	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
Alabama	7	1	2	1	1	1	3	3	...	1	...
Arizona	...	4	5	2	5	3	...	2	2	...	2
Arkansas	...	3	4	...	5	1	4	1	1	...	...
California	138	142	96	121	136	89	63	43	31	23	24
Colorado	44	16	23	25	13	18	19	6	21	1	3
Connecticut	133	132	109	63	105	66	78	15	30	50	77
Delaware	5	14	8	16	12	13	8	3	6	6	8
Dist. of Columbia	10	24	5	12	21	...	...	...	2	1	1
Florida	2	2	...	...	...	1	4	...	...	...	...
Georgia	...	...	4	2	4	...	5	10	25	4	...
Idaho	4	3	3	4	4	2	3	1	2	...	1
Illinois	473	542	508	468	558	516	276	218	39	47	95
Indiana	211	217	220	...	255	164	167	53	43	17	66
Iowa	137	138	255	231	174	91	141	54	24	22	27
Kansas	88	56	61	64	72	86	50	25	8	5	7
Kentucky	72	17	21	18	33	17	26	6	5	2	11
Louisiana	2	3	7	8	4	...	4	2	2	4	4
Maine	32	29	15	11	16	22	7	4	...	6	6
Maryland	22	13	10	23	21	10	8	13	11	15	10
Massachusetts	103	467	339	163	430	430	63	27	45	43	87
Michigan	157	288	193	163	203	177	143	69	70	21	72
Minnesota	162	174	95	95	65	69	64	17	17	6	12
Mississippi	...	...	2	2	1	...	...	1	1	...	...
Missouri	84	218	325	286	375	352	112	60	57	83	53
Montana	17	40	3	6	11	9	10	...	6	...	1
Nebraska	63	43	47	58	46	42	26	17	12	17	10
Nevada	1	2	...	1	4	...	1	...	...	...	...
New Hampshire	23	9	29	13	13	23	10	2	3	3	15
New Jersey	204	350	368	402	472	488	167	43	16	21	55
New Mexico	1	5	1	6	1	1	3	...	...	3	...
New York	549	566	681	752	647	807	327	227	115	144	250
North Carolina	...	1	1	...	...	...	1	5	...	...	...
North Dakota	8	29	11	8	13	4	13	1	2	...	...
Ohio	327	329	410	375	543	323	166	105	55	70	45
Oklahoma	3	7	...	194	9	12	11	9	11	1	4
Oregon	13	9	11	5	9	21	19	3	5	4	5
Pennsylvania	744	721	969	491	987	986	6 3	442	265	491	487
Rhode Island	30	11	21	39	39	42	19	11	2	21	25
South Carolina	...	...	1	...	...	4	...	1	...	...	...
South Dakota	10	15	5	8	10	9	4	2	...	...	1
Tennessee	1	5	6	4	5	4	10	3	12	3	1
Texas	2	4	11	7	11	4	2	...	3	2	...
Utah	22	25	18	30	12	18	8	2	1	1	1
Vermont	14	10	14	18	10	12	4	4	1	...	3
Virginia	11	5	8	...	5	...	...	3	1	...	5
Washington	25	15	25	73	28	32	27	22	12	13	5
West Virginia	16	34	64	27	59	25	20	2	2	2	8
Wisconsin	215	220	155	150	187	157	171	52	36	16	23
Wyoming	2	8	3	...	1	1	4	4	1	...	...
Totals	4169	5178	5466	4413	5623	5307	2922	1603	988	1163	1506

can be seen. Prohibitive ordinances were enforced in Baltimore, Boston, Chicago, Cleveland, Minneapolis, Newark, St. Paul, Toledo, Trenton, Washington and elsewhere. Restrictive measures were used in New York, St. Louis, Pittsburgh, Buffalo and elsewhere. Philadelphia reported four deaths this year, Chicago reported three, Buffalo reported two, and one each was reported for New York, St. Louis, Pittsburgh, Newark, N. J., Scranton, Pa., Springfield, Mass., Tacoma, Wash., Duluth, Minn., and Peoria, Ill., making a total of eighteen deaths in twelve of our eighty-four largest cities, as compared with seven killed last year, twelve in 1912, sixteen in 1911, forty-three in 1910 and eighty in 1909. For the last four years Philadelphia has been the only large city having more than 100 injuries, having reported 237 this year, a decrease of 103 below last year. Altogether 681 non-fatal injuries were reported for these large cities this year, as compared with 854 last year, 522 in 1912, 774 in 1911, 1,457 in 1910 and 2,936 in 1909. A slight increase over last year is seen in the records of some of these cities, although others, notably St. Louis, Boston, Baltimore, Pittsburgh, Buffalo, Milwaukee and others, have brought the returns considerably below last year's record. Of these eighty-four cities, twenty-three have a record of six or more injured, two less than last year, and twenty-four less than 1909. Twenty-four of these cities had a clean record this year, as compared with thirty-one last year, thirty in 1912, twenty-four in 1911, and eighteen in 1910. Probably the most marked reduction in the number of injured in the last few years have been in Chicago, St. Louis, Boston, Pittsburgh, Milwaukee and Newark. From Newark no casualties were reported in 1912 and 1913 and only two this year, a decided contrast to the record of 1909, when 150 were injured and one person was killed. It is noteworthy that nearly half of all casualties this year were in sixty-two of these larger cities.

WHERE THE RESPONSIBILITY RESTS

As has been repeatedly stated in these annual reports, for the great majority of Fourth of July injuries, *the responsibility clearly rests with city governments*, since the employment of death-dealing methods of celebration is subject to their regulation. It is clearly the duty of city authorities, therefore, to decide whether or not the maiming of hundreds, the agonizing deaths from lockjaw and the burning to death of little children by fire from fireworks are to be continued. Rigidly enforced prohibitive ordinances in sixty-two of our largest cities, therefore, would do much toward doing away with this national disgrace. Prohibitive ordinances are most effective and permanent, as shown by the results in Baltimore, Cleveland, Newark, Trenton, Chicago, Washington and elsewhere, and even restrictive ordinances, if they could be rigidly enforced, would have good results. But the enforcement of restrictive measures is difficult and requires constant vigilance on the part of the police. By the sound it is difficult to know whether an explosion is due to a firecracker 3 inches long or to one 5 inches long, or whether it is due to some other forbidden form of fireworks. Again, restrictive ordinances are usually looked on as half-way measures and are not expected to be enforced. Not so prohibitive ordinances, however, under which any explosion is recognized at once as a violation of the law. Again, ordinances which are merely restrictive are ineffectual since the smaller firecracker and sparklers which have been considered so harmless caused the fires this year by which sixteen children, mostly little girls, were burned to death.

CONCLUSIONS

In spite of the slightly reduced number of tetanus cases this year the returns are somewhat discouraging. The increased number of killed and injured indicates a relaxation in the enforcement of the ordinances which were so ably enforced two years ago. Instead of a relaxation of restrictive measures, the use of fireworks in the celebration of the Fourth of July should be strictly prohibited. To kill outright forty persons and to wound and maim 1,466 others is not a very fitting token of our thankfulness for the

Declaration of Independence, signed over a hundred years ago! Is it not rather an acknowledgment that in this country rowdyism cannot be restrained, or that the only way we can show our patriotism is by riot and murder? The results of two years ago show plainly that these evils can be entirely done away with. It is hoped that city officials will continue their prohibitive measures until this desirable end is attained.

TABLE 9.—NUMBER REPORTED KILLED AND INJURED IN THE LARGER CITIES DURING EIGHT YEARS

Marginal Number	City	1907		1908		1909		1910		1911		1912		1913		1914		Totals		Marginal Number
		Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	
1	New York City	22	427	11	316	7	559	6	179	3	91	1	58	..	65	1	94	51	1,784	1
2	Chicago	16	151	12	202	..	118	4	62	2	53	2	12	1	12	3	18	40	628	2
3	Philadelphia	7	248	6	486	9	508	4	405	..	284	2	127	3	340	4	237	35	2,585	3
4	St. Louis	3	189	4	229	4	162	..	44	..	58	..	48	..	72	1	43	12	836	4
5	Boston	3	50	6	100	5	167	..	35	..	3	..	16	1	15	..	13	15	399	5
6	Cleveland	3	43	12	93	..	4	..	1	..	5	..	1	..	4	..	1	15	172	6
7	Baltimore	..	5	1	70	..	5	..	6	..	10	..	10	1	12	..	6	2	64	7
8	Pittsburgh	10	88	..	30	5	48	6	36	1	23	1	14	1	46	1	11	25	286	8
9	Detroit	2	46	..	10	2	40	1	17	..	18	2	30	1	5	..	43	8	203	9
10	Buffalo	..	18	3	11	..	33	1	13	..	16	..	6	..	16	2	9	6	122	10
11	San Francisco	..	..	..	11	..	12	..	9	1	8	..	7	..	9	..	4	1	60	11
12	Milwaukee	2	93	..	70	..	78	3	112	1	19	..	24	..	10	..	8	6	414	12
13	Cincinnati	2	89	1	112	3	86	3	40	1	4	..	21	..	26	1	4	11	391	13
14	Newark, N. J.	1	129	2	81	1	150	1	15	..	..	..	..	..	..	..	..	5	377	14
15	New Orleans	..	8	..	4	..	..	..	3	..	2	..	2	..	3	..	4	..	26	15
16	Washington, D. C	..	12	..	21	..	..	..	..	..	..	..	2	..	1	..	1	..	37	16
17	Los Angeles, Cal	..	35	..	40	..	26	..	..	..	4	..	5	..	6	..	1	..	117	17
18	Minneapolis, Minn	..	12	..	10	1	24	..	30	..	..	..	..	..	2	..	1	..	70	18
19	Jersey City, N. J	..	31	5	34	1	14	1	44	..	14	..	3	..	..	..	2	7	142	19
20	Kansas City, Mo	1	46	..	55	4	67	1	25	..	4	..	1	..	..	..	..	6	198	20
21	Seattle, Wash	1	3	..	1	3	10	..	7	..	..	..	2	..	2	..	1	4	26	21
22	Indianapolis, Ind	1	31	1	14	1	25	..	24	..	5	..	6	..	1	..	11	3	127	22
23	Providence, R. I	..	30	1	21	..	13	..	10	1	9	..	..	2	17	..	7	4	97	23
24	Louisville, Ky	..	13	..	10	1	10	1	13	..	3	..	2	..	2	..	8	2	61	24
25	Rochester, N. Y	..	12	..	10	..	5	..	10	..	4	..	2	..	4	..	8	..	55	25
26	St. Paul, Minn	..	10	..	12	..	18	3	40	1	4	..	21	..	26	1	4	11	201	26
27	Denver, Colo	..	8	..	13	..	12	1	6	..	2	..	7	..	1	..	1	1	50	27
28	Portland, Ore	..	2	..	3	..	16	..	13	..	1	..	2	..	..	..	..	..	37	28
29	Columbus, Ohio	5	35	..	5	1	19	..	..	..	1	..	1	..	2	..	..	6	64	29
30	Toledo, Ohio	1	5	..	8	2	3	1	2	..	5	1	1	..	7	..	..	5	32	30
31	Atlanta, Ga	1	4	..	3	..	..	..	5	..	10	..	28	..	4	..	..	1	54	31
32	Oakland, Cal	..	9	..	..	..	8	..	9	..	1	..	2	..	..	..	..	..	29	32
33	Worcester, Mass	1	6	2	10	1	42	..	6	..	1	..	10	..	14	..	3	4	102	33
34	Syracuse, N. Y	..	20	..	14	..	13	..	6	..	1	..	4	..	15	..	6	..	79	34
35	New Haven, Conn	..	2	..	..	..	15	..	..	..	1	..	6	..	10	..	11	..	45	35
36	Birmingham, Ala	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	3	36
37	Memphis, Tenn	..	1	..	3	..	4	..	2	..	..	..	2	..	1	..	..	..	13	37
38	Scranton, Pa	..	5	1	17	1	20	..	6	..	10	..	..	..	9	1	15	3	91	38
39	Richmond, Va	..	..	..	..	1	1	..	..	..	..	..	5	..	..	..	4	1	5	39
40	Paterson, N. J	1	29	2	21	..	45	1	14	..	5	..	2	..	4	..	..	5	130	40
41	Omaha, Neb	..	25	..	10	1	17	..	17	..	7	1	2	..	16	..	6	2	100	41
42	Fall River, Mass	..	..	..	12	..	19	..	1	..	..	..	1	..	..	..	2	..	35	42
43	Dayton, Ohio	..	11	..	14	..	4	..	2	..	1	..	1	..	..	..	..	2	37	43
44	Grand Rapids, Mich	..	20	1	20	..	..	..	17	1	6	..	9	..	13	..	2	..	100	44
45	Nashville, Tenn	..	2	..	..	..	3	..	8	..	2	..	10	..	2	..	..	..	24	45
46	Lowell, Mass	..	23	..	..	..	18	..	..	1	3	1	..	..	..	..	..	2	44	46
47	Cambridge, Mass	..	..	..	17	..	..	..	..	..	4	..	..	..	..	..	..	..	25	47
48	Spokane, Wash	..	..	..	..	..	..	..	..	..	..	..	4	..	8	..	2	..	21	48
49	Bridgeport, Conn	..	1	..	27	..	21	..	4	..	4	..	1	..	3	..	23	..	84	49
50	Albany, N. Y	1	24	..	37	..	31	..	11	1	5	..	..	..	4	..	1	2	113	50
51	Hartford, Conn	..	18	..	18	..	11	..	14	..	1	..	9	..	27	..	3	..	101	51
52	Trenton, N. J	..	38	1	17	1	58	..	..	..	1	..	..	..	1	..	1	2	119	52
53	New Bedford, Mass	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	1	..	4	53
54	Reading, Pa	..	17	..	13	..	17	1	3	..	4	..	3	..	21	..	5	1	85	54
55	San Antonio, Tex	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	55
56	Camden, N. J	..	16	..	29	4	14	..	6	..	..	1	..	..	..	..	..	5	66	56
57	Salt Lake City	..	15	..	9	2	14	1	4	..	..	..	1	1	..	..	3	4	41	57
58	Lynn, Mass	..	3	..	11	3	16	..	4	..	..	2	..	..	..	..	3	3	36	58
59	Springfield, Mass	..	21	1	36	1	9	1	2	..	4	..	..	1	1	..	4	4	73	59
60	Wilmington, Del	1	14	..	13	3	9	..	6	..	2	..	5	..	6	..	6	4	69	60
61	Des Moines, Iowa	1	31	..	41	..	13	..	23	..	12	..	..	..	6	..	..	6	132	61
62	Lawrence, Mass	..	11	1	..	5	22	..	..	..	..	..	..	..	..	..	..	6	33	62
63	Tacoma, Wash	2	4	1	3	..	3	..	2	..	..	..	1	..	..	1	..	4	13	63
64	Kansas City, Kan	1	10	..	17	..	33	..	14	1	5	..	..	..	..	..	..	2	79	64
65	Yonkers, N. Y	..	32	..	5	..	8	..	..	..	4	..	..	..	..	..	..	..	49	65
66	Houston, Texas	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	66
67	Duluth, Minn	..	13	..	9	2	10	..	3	..	1	..	..	..	..	1	1	3	37	67
68	St. Joseph, Mo	1	23	1	41	1	24	..	11	..	1	..	..	..	..	..	3	3	103	68
69	Somerville, Mass	..	..	..	..	..	1	..	2	..	..	..	..	..	..	..	..	..	3	69
70	Troy, N. Y	..	..	2	15	..	16	1	8	..	2	..	1	..	1	..	6	..	52	70
71	Utica, N. Y	..	18	..	10	..	5	..	1	..	..	..	..	..	2	..	2	..	38	71
72	Waterbury, Conn	2	8	..	14	..	5	..	15	1	..	..	..	..	1	..	..	3	43	72
73	Schenectady, N. Y	..	4	..	20	..	8	1	13	..	7	..	..	..	1	..	2	1	55	73
74	Hoboken, N. J	..	..	1	24	..	4	..	4	..	..	1	..	..	..	..	..	1	37	74
75	Elizabeth, N. J	..	43	..	72	..	37	..	15	..	1	..	..	..	..	..	..	..	168	75
76	Manchester, N. H	..	3	..	1	1	5	..	..	..	..	..	1	..	1	..	2	1	13	76
77	Evansville, Ind	..	5	..	12	..	6	..	7	..	1	..	..	..	..	..	9	..	40	77
78	Norfolk, Va	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	78
79	Wilkes-Barre, Pa	1	..	3	28	1	15	2	8	..	2	..	5	..	..	..	1	7	66	79
80	Peoria, Ill	..	8	..	27	1	22	1	17	..	..	..	2	..	..	1	3	3	79	80
81	Erie, Pa	..	..	..	1	..	4	..	2	..	3	..	1	..	1	..	3	..	15	81
82	Savannah, Ga	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	82
83	Harrisburg, Pa	..	23	1	71	..	22	..	3	..	1	..	..	..	..	..	1	1	121	83
84	Portland, Me	1	2	..	..	..	2	..	..	1	2	..	..	..	1	..	1	2	8	84
	Totals	94	2,458	83	2,860	80	2,936	43	1,457	16	774	12	522	10	854	18	681	356	12,542	
	Totals elsewhere	70	1,791	80	2,600	135	2,155	88	1,335	41	772	29	423	22	309	22	825	487	10,210	
	Grand totals	164	4,249	163	5,460	215	5,091	131	2,792	57	1,546	41	945	32	1,163	40	1,506	843	22,752	

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street . . . Chicago, Ill.

Cable Address . . . . "Medic, Chicago"

Subscription price . . . . . Five dollars per annum in advance

Contributors, subscribers and readers will find important information on the second advertising page following the reading-matter.

SATURDAY, AUGUST 29, 1914

THE FOURTH OF JULY CELEBRATION IN 1914

The Fourth of July has again come and gone. A sufficient time has passed to collect and to verify all reports of deaths and serious injuries. All cases of tetanus developing from injuries received in the celebration have been recorded, and the tabulated statistics of all casualties are printed this week on another page.

DEATHS AND INJURIES THIS YEAR

The returns show a continued increase over the casualties of two years ago, there being 1,506 this year as compared with 1,163 last year and 988—the lowest number—in 1912. There were 40 deaths this year as compared with 32 last year—the lowest number—and 41 in 1912. There were only 3 cases of tetanus—the lowest number—compared with 4 last year and 7 in 1912. These returns are very low, however, when compared with 130 cases of tetanus, 215 deaths and a total of 5,307 casualties, which was the record for 1909, only five years ago. Again, the fact that there were two days for celebration both last year and this (Sunday coming next to the holiday), may have had considerable to do with the comparatively slight increases of the last two years.

EVIDENCES OF PROGRESS

In spite of the slight increase in the numbers of killed and injured there are abundant reasons why those who are laboring for better forms of celebration should feel encouraged. Never has any cause been taken up so effectively by the public press as has this movement for a "safe and sane celebration of the Fourth of July"—an expression which has become so familiar in a few brief years. Never before has public sentiment been so unanimous or positive as in the overwhelming demand for a cessation of the noisy and destructive methods of celebration. And this year these evidences were more marked than ever. Besides the splendid service rendered by the newspapers in the work for reform, societies and associations, municipal, state and national in their scope, have been unusually active.

PROHIBITIVE MEASURES

In at least eight states—Arkansas, Indiana, Kansas, Nebraska, New York, Ohio, Pennsylvania and Texas—just prior to the Fourth, the state fire commissioners sent special communications to the cities and towns throughout their states urging that the use of fireworks be discontinued or carefully safeguarded. In one state, Kansas, a model prohibitive ordinance was circulated which, according to the report, was adopted and enforced in over a hundred cities. This is a plan worthy of being followed elsewhere. It points to the prompt solution of the problem since the control of the use of fireworks clearly rests with city and town governments. Reports of the enforcement of prohibitive measures came from hundreds of cities in all sections of the country. This positive method of stamping out lawlessness, noise and destruction is clearly sweeping the land. That many of our larger cities have greatly improved their records in recent years by such measures may be noted in Table 9 on page 781.

NEWER AND BETTER METHODS SUBSTITUTED

Mere prohibitive measures have been surpassed in effectiveness, perhaps, by the wide adoption of better forms of celebration. Band concerts, picnics, parades and programs of various sorts have never been so generally in evidence as on the Fourth of July this year. This is the strongest indication that the reform is to be permanent. Never before has there been so general a display of flags in both public and private places. From all over the land came reports showing the cessation of noise, the absence of fires, formerly so common, and less need of constant vigilance by the police to restrain the more noisy celebrants. From everywhere came comments regarding the absence of deaths and injuries from the use of fireworks. How different from the awful results reported annually up to only a few brief years ago!

SIGNIFICANCE OF THE CHANGE

The watchword of this country has been personal liberty, which was heralded to the world by the Declaration of Independence, the signing of which is celebrated on the Fourth of July. The manner of observing this day, therefore, may be taken as a fair index of other tendencies in our national life. The individual was at liberty to celebrate the Fourth of July just as he was given the widest freedom in religion, in business and in other walks of life. But as the absence of restrictions led to abuses in the business world, so unlimited freedom gradually led to abuses in celebrating our Independence Day. The nation is learning that the greatest liberty to the greatest number demands that certain restrictions be placed on the liberty of the individual. In order to correct abuses in the business world in recent years much publicity has been given to political and commercial trickery and graft in high places and low, and there is a decided trend toward improvement.

The liberty to use fireworks in the celebration of the Fourth of July gradually degenerated into an annual orgy during which hoodlums held free license to kill,

to maim and to destroy. So general and so free had the use of fireworks become that even babes were suffered to handle fireworks, so often deadly even to adults accustomed to handling them. So bad had conditions grown that the celebration was annually demanding a toll of hundreds of children dying in the agonies of lockjaw, burned to death, shot down or otherwise slain, while thousands of others were blinded, maimed for life or otherwise injured.

BEGINNING OF THE CHANGE

So settled was the nation in this annual holocaust that it had come to be looked on almost as essential, and it required that the awful results be given publicity by THE JOURNAL time and time again through six years before the public could be induced to shake off its lethargy, and before any check could be placed on the crimes being committed annually in the name of patriotism. For six years THE JOURNAL's reports with a few exceptions seemed to fall on deaf ears. A notable exception was the Chicago *Tribune*, which as a news feature for several years immediately following the Fourth had published unverified figures of the deaths and injuries. In spite of reports, however, the total casualties continued to increase until in 1908 there were 5,623 people killed and injured! In that year THE JOURNAL in its report published the returns from the forty-two largest cities. The figures revealed the fact that a great majority of the deaths and injuries were clearly due to lawlessness and disorder permitted in those cities. The corollary was also made clear that the governments of these cities were responsible for such casualties, inasmuch as they could be prevented by the enforcement of prohibitive measures. From that time on a wave of public opinion demanding a change of methods has been gathering and has grown with each succeeding year. This year the demand has been so decided as to leave no room for doubt as to the final outcome—the nation is to be freed from this annual holocaust in the name of American freedom.

THE CELLS IN COW'S MILK

The importance of cow's milk in the dietary of the well and the sick alike, and its indispensability as an article of food in the nourishment of a great group in our infant population tend to keep alive a wide-spread interest in the quality and purity of the available supply.

The significance of bacteria in milk, their influence in modifying its keeping properties, their possible danger as sources of infection—all of these facts have become a part of the common store of knowledge. Information concerning them has been spread broadcast, in magazines and daily newspapers. The problem of other structural elements in milk has not reached the public eye to the same extent; indeed, it has scarcely passed beyond the stage of scientific inquiry.

Many of the secretions of the body contain cells discharged from the tissues, and these cells in general are of two kinds: (*a*) epithelial cells discharged either from the secreting portions of the glands or from the lining of ducts or general epithelial surfaces, and (*b*) leukocytes which make their way through the walls of the capillaries and the lymphatics into the epithelial layers which produce the secretion of the gland and, finally, into the secretion itself. Under certain pathologic conditions the discharge of these cells may increase greatly above the normal amount. Milk ordinarily contains such cells. They were first described in connection with colostrum under the name of colostral corpuscles.[1] American investigators[2] long ago called attention to the occurrence of leukocytes in market milk; and by speaking of them as "pus" cells (as is commonly done of leukocytes in urine) an imputation of possible danger was early placed on the fluid containing them. The question of the sanitary significance of the cells in milk has since then assumed considerable importance. A great deal of confusion in the discussion of the nature of these cells and their hygienic significance has been due to the assumption by many investigators that the presence of the cells under any conditions is a pathologic phenomenon and therefore undesirable. As a matter of fact the leukocytes which have passed through the epithelial lining of the alveolus in some part of the mammary gland under normal conditions are not pus cells any more than leukocytes in the lymph and blood, saliva and other secretions are pus cells.

As often happens in the progress of experimental research, imperfect methods of investigation have furnished apparently conflicting answers to the questions here involved. At one time the sediment of milk was depended on to disclose the presence of the cells. Subsequently it was found that many of these may be missed by this method of examination because they may rise with the cream layer and thus fail to appear in the sedimentary deposits. The whole situation, which is evidently in need of revision and supplementary study, has been reviewed by the bacteriologist of the New York Agricultural Experiment Station at Geneva.[3] The evidence thus far obtained indicates that the largest average number of cells occurs in colostral milk, though equally large numbers of cells occasionally occur in milk drawn at any time during the lactation period. Several very high cell-counts have been obtained from the milk of animals nearing the end of the lactation period, and the evidence given indicates that such high counts are more common during the latter part of the period than during its height; but the average cell-counts for the latter part of the period do not seem to be markedly higher than

1. Donne, A.: Du Lait et en particulier de celui des nourrices, Paris, 1837.
2. Stokes, W. R., and Wegefarth, A.: The Microscopic Examination of Milk, Med. News, 1897, lxxi, 45.
3. Breed, R. S.: Cells in Milk Derived from the Udder, New York Agric. Expt. Station, Bull. 380, March, 1914.

the average cell-counts for the earlier part. There are marked daily variations in the number of cells discharged, the cause or causes of which have not yet been discovered. No constant relationship holds between the number of cells discharged in the fore-milk and the number discharged later in the milking process. There is a constant increase in the number of cells discharged in the strippings, the cause of which is not yet clear. The four quarters of the udder do not act as a unit in the discharge of the cells, but show as wide variations in number and character of the cells discharged as do separate udders.

The number of cells found in the milk of an ordinary dairy may come as a surprise to many. Out of the 122 cows whose milk has been examined, 59 were found to give cell-counts under 500,000 per cubic centimeter, 36 gave counts between 500,000 and 1,000,000 per cubic centimeter and 27 gave counts of over 1,000,000 per cubic centimeter. The average cell-counts for all of the cows was 868,000 cells per cubic centimeter. The milk of all the cows was normal in appearance and was sold or used by their owners, who had every reason to suppose that the milk was normal milk. Milking-machines, which are being operated more and more extensively in the dairy industry, have been charged with inducing a greater exodus of cells into the milk owing to the vacuum that these mechanical devices create. Dr. Breed states that several things seem to indicate that the number of cells present in milk drawn by a vacuum machine is somewhat less than the number present in hand-drawn milk. The results obtained show that there is no reason for thinking that changes in the vacuum or high vacuums may, in themselves, cause the discharge of excessive numbers of cells, or that high vacuums may draw blood from the interior of the udder.

The leukocytes predominate among the cells. The epithelial cells and fragments are presumably discharged because they are worn out or dislodged in the process of the secretion of the milk. The reason for the presence of the leukocytes is not so clear. By analogy with known leukocytic wanderings in certain pathologic states it has been widely held that the blood-cells are attracted into the milk by the presence of bacteria in the udder, especially by the particular kind of bacteria known as the pus-forming streptococci. This belief has arisen because of a large body of evidence which indicates that the milk of cows suffering from mastitis caused by a streptococcic infection, ordinarily, if not invariably, contains large numbers of cells. Dr. Breed has pointed out, however, that no systematic attempt has yet been made to discover whether there is a relationship between the number and kinds of cells discharged and the bacterial content of the udder which frequently harbors micrococci. He inclines to the belief that there are other reasons for the discharge of leukocytes in the milk than the presence of bacteria in the udder. These other reasons undoubtedly have to do with the physiologic conditions surrounding the process of milk secretion. The chapter dealing with the hygienic significance of the cells cannot yet be regarded as closed.

PLUMBING AND HEALTH

It is not surprising perhaps that old ideas concerning the causes of disease survive in some strata of society a long time after these ideas have been generally outgrown or discredited. All the same it is a little disconcerting to find that typhoid fever can still be complacently attributed to bad plumbing. When we read that "insufficient laws regulating plumbing and sanitation in Virginia, Maryland and the District of Columbia are largely responsible for the high typhoid rate and the prevalence of other diseases in the two states and the district," and again that "much of the fever and other forms of disease with which the health authorities are constantly wrestling is caused by noxious gases and vapors emanating from neglected or defective pipes in the homes of the people," we are inclined to rub our eyes and ask ourselves if the education of the community is really proceeding at the pace we sometimes like to believe. The assertions quoted above, however, were reported as made at the Association of Plumbers, Gasfitters and Steamfitters which recently met in Richmond, Va., and not at a convention of health officers or physicians.

It is hardly necessary to point out that typhoid fever — or any other fever — is not caused by bad smells, and that the small quantity of the gases of decomposition found in well-ventilated sewers has never been proved to exert any injurious effect whatever on health. A connection between plumbing and health has been shown to exist at just one point. Plumbing is of value to public health only so far as it removes human excreta from the immediate neighborhood of dwellings and so does away with the danger of fly-borne typhoid and other infection which arises from allowing infectious material to accumulate in family privy-vaults. Disease germs are not found in sewer air; indeed, it is difficult on physical grounds to see how they could get there. The "noxious gases and vapors," so dear to the plumber's imagination, are conspicuous by their absence in all perfectly constructed sewer systems, as every visitor to the great sewers of Paris and other modern cities well knows. "Defective plumbing" has about as much relation to public health as any other mechanical defect in house construction.

On the financial aspects of modern city plumbing ordinances we prefer not to dwell at this time. It is a well-recognized fact that these ordinances are drawn with no uniformity in our American cities and that what is required in one city may be prohibited in another. High authorities maintain that the system of

V. 191

modern house plumbing which is made legally obligatory on housebuilders in many places entails a large, needless and altogether unjustifiable expense. Conceivably it is to the financial interest of plumbing supply houses—or somebody—to have the required system of plumbing as elaborate and as expensive as possible.

One feature of this situation deserves attention. It is plain that the most serious obstacle to the universal replacement in sewered towns of the dangerous privy-vault by the water-carriage system is the high cost of the plumbing. In this respect every unnecessary refinement and elaboration in plumbing outfits and legal requirements is a harm, not a help, to public health. The greatest possible simplicity and cheapness compatible with efficiency is what is needed in really "sanitary" plumbing, not a labyrinth of traps, vents and back-vents. If the plumbing interests really wish to aid the hygienic welfare of the community they can best do this, not by insisting on still more complicated devices and "inspections," but by simplifying and cheapening the cost of installing and maintaining the pipes and fixtures essential for carrying off the house wastes in a speedy and inoffensive manner. Finally, let us ask this question: To what extent do the plumbing ordinances in our American cities represent the prevailing opinion of public health experts and trained health officials, and to what extent do they represent the efforts of commercially interested individuals or organizations to entrench themselves behind the active if not always well-informed desire of the people to safeguard the public health?

MIXED VACCINE AND PHYLACOGENS

The noted advance in therapeutics shown in the development of vaccine therapy has brought with it grave dangers as well as advantages. We have, on a number of occasions, discussed in special articles and in editorials the dangers which threatened from the rapid commercialization of this new method. The unscientific character of mixed vaccines and of the mixed filtered products of a number of vaccines marketed as "Phylacogens" has been especially emphasized and the danger from their indiscriminate use pointed out. A little over a year ago we published a series of articles dealing with the whole subject in which the nature of mixed vaccines was described[1] as follows:

> The mixed stock vaccine of commerce is a makeshift. It is offered as a substitute for correct diagnosis. Like all such makeshifts in science, it is doomed to failure. . . . A burden is being forced on the profession which will speedily assume the proportions attained by proprietary drug combinations. The menace cannot be counteracted unless physicians will accept the guidance of unselfish, non-commercial interests and refuse to purchase and use mixed commercial vaccines.

This admonition to seek the guidance of unbiased scientific observers is deserving of special emphasis at the present time. Five weeks ago we published the address of the chairman of the Section on Pharmacology and Therapeutics, Dr. John F. Anderson,[2] one of our foremost workers in this branch of biologic science, in which attention was very forcibly drawn to the dangers involved in the use of biologic products of non-specific character. He says:

> Bacterial therapy undoubtedly in some cases is a most valuable method of treatment; but when the claim is made that a combination of the dead bodies or the filtered products of a number of different bacteria are useful for the treatment of certain diseases with a different specific cause, it would seem that the suggestion closely approaches quackery.

Further he says:

> Aside from the doubtful practice of the indiscriminate use of unproved methods of treatment, it has seemed to me that a great injustice is done the patient by their use, since some of the preparations that have been widely exploited have been shown to be harmful in certain instances and even to have caused death. So the first step in attempting to remedy conditions is to awaken the physician to the importance of ignoring the claims of those who are pushing these new methods until their usefulness and harmlessness has been clearly demonstrated by those best in a position to do so.

As a result of scientific methods in teaching therapeutics, physicians have gradually given up almost entirely the use of "shotgun" prescriptions and now prescribe a drug or a combination of one or two drugs, each given for the purpose of exerting a definite action. On the other hand, the purveyors of bacterial vaccines have gradually increased the number of different bacteria in their mixed vaccines until some of those now advertised for sale contain as many as seven different kinds of bacteria, and some of the "Phylacogens" contain the filtered products of at least eleven bacterial species!

Under the present federal law there does not seem to be any way in which the federal government can do more than is being done at present. It is a case in which the physician becomes the sole guardian of the patient committed to his care. He is the one and only responsible individual. He cannot throw the blame for bad results back to the manufacturer. When he subjects his patients to the possibility of harm by the use of these unscientific and dangerous preparations, the physician assumes the responsibility, whether he wants to or not.

If physicians would report their failures when these vaccines are used, and especially report the fatalities consequent on their use, with the name of the manufacturer of the particular product used, we are quite sure there would result a lessening in the enthusiasm of the purveyors of these products.

When tempted by the optimistic statements of the interested manufacturer of these mixtures to give them a trial the physician should remember that the

1. Bacterial Vaccine Therapy: Its Indications and Limitations, p. 37, reprinted from THE JOURNAL A. M. A., April 26-June 28, 1913, price, 10 cents.

2. Anderson, John F.: Some Unhealthy Tendencies in Therapeutics, THE JOURNAL A. M. A., July 4, 1914, p. 1.

warnings of disinterested scientists are of far more value than uncritical clinical reports put out under commercial auspices.

This we quote from a recent book by Victor C. Vaughan,[3] President of the American Medical Association:

> Every time an unbroken protein is introduced into the body it carries with it, and as a part of it, a poison. From the very careless, rash, and unwarranted way in which "vaccines" of most diverse origin and composition are now used in the treatment of disease, this matter certainly cannot be understood or its danger appreciated by those who subject their patients to such risks. It should be clearly understood that all proteins contain a poisonous group—a substance which in a dose of 0.5 mg. injected intravenously kills a guinea-pig. This poison is present in all the so-called "vaccines" now so largely used, and it is not strange that death occasionally follows the use of "Phylacogen" or similar preparations. Not only do these proteins contain a poison, but when introduced parenterally the poison is set free, not in the stomach, from which it may be removed, but in the blood and tissues. It is possible that vaccine therapy may become of great service in the treatment of disease: Even now there are occasional brilliant results which are reported while the failures and disasters are not so widely advertised.

Such a warning as this quotation contains, from a man so eminent as Dr. Vaughan, merits and should receive the careful attention of medical men; at least it should have as much weight as the "clinical evidence" spread broadcast among our profession by commercial houses.

THE OPIUM ALKALOIDS AND DIABETES

Opium preparations have long been used in diabetes, and there is a wide-spread belief that they are frequently efficient in diminishing the excretion of sugar in this disease. Data might readily be cited from the literature of clinical medicine to show apparently advantageous results following opium medication. No satisfactory explanation has yet been furnished of the manner in which excretion of sugar is diminished. It has been suggested that the alleged beneficent influence of the drug is attributable in a general way to its well-known sedative action on the nervous system. This hypothesis contains, at least, something tangible, in view of the fact that more or less ill-defined conditions of nervous irritability have been said to produce certain types of diabetes. Now that the investigation of the sugar-content of the blood has assumed an importance as great as, if not greater than, the quantitative determination of the urinary sugar, the problem of the possible mode by which opium acts in this connection is presented anew. Dr. Kj. Otto af Klercker of the medical-chemical institute of the Swedish University in Lund has accordingly studied the influence of the opium alkaloids on certain forms of experimental hyperglycemia.[1] In the cases in which this condition was elicited by injections of epinephrin or by the well-known piqûre experiment in which an injury to the roof of the fourth ventricle in the brain is promptly followed by glycosuria, no convincing effect attributable to the administration of opium products could be demonstrated. On the other hand, when an alimentary hyperglycemia was brought about by feeding unduly large quantities of glucose the inhibitory effects of opium products were clearly manifest. For example, repeated injections of opium alkaloids in quantities which of themselves had no demonstrable effect on the level of the sugar in the blood, nevertheless prevented the expected rise after the ingestion of sugar.

The newer studies of Magnus[2] and others have made clear certain effects of morphin on the movements of the alimentary tract which may serve to explain the inhibitory phenomena just referred to in connection with alimentary glycosuria. It is now known that this alkaloid greatly retards the discharge of its contents from the stomach into the small intestine, from which they are absorbed. It is apparent, therefore, that the antiglycosuric action of the opiates in diabetes may be due to the fact that the carbohydrates are not absorbed at the usual rate because they are not furnished in sufficient concentration through discharge from the pylorus. That the expected hyperglycemia does not develop in characteristic degree when opium products are administered may be due to the failure of the lower alimentary tract to be overloaded with readily absorbable carbohydrates within comparatively brief periods of time. Whether the facts here adduced will also suffice to explain the reduction in the output of sugar occasionally noted in human practice under similar therapeutic conditions, remains to be ascertained more definitely.

THE DANGER OF INFECTION FROM ICE

The modern practice of using iced food and drinks is so universal in this country that it is important to determine to what degree ice may be relied on as not carrying infection. When in the seventies and eighties of the last century it was shown that pathogenic bacteria might survive freezing, ice fell under suspicion as a possible medium for the transmission of disease; yet few epidemics have been ascribed to it, and the evidence concerning these has been regarded as inconclusive. H. S. Cumming[1] in a recent article makes a study from the point of view of the source of ice, the physical and biologic changes accompanying or consequent on its formation, and the methods employed in its collection or manufacture and handling.

3. Vaughan, Victor C.: Protein Split Products in Relation to Immunity and Disease, 1913, p. 236.

1. Klercker, Kj. Otto af: Untersuchungen über die Einwirkung der Opiumalkaloide auf gewisse Hyperglykämien, Biochem. Ztschr., 1914, lxii, 11.

2. Morphin and Constipation, editorial, THE JOURNAL A. M. A., May 31, 1913, p. 1711. Magnus: Arch. f. d. ges. Physiol., 1908, cxxii, 210.

1. Cumming, H. S.: Safe Ice, Pub. Health Rep., Aug. 7, 1914, p. 2066.

Ice is either natural or artificial. Until recently, in order to secure clean, transparent artificial ice, it was necessary to distil the water used, thus destroying all disease-germs present. With the newer methods employed, filtration is held to be sufficient. Cumming remarks that the fact, well known to chemists, that during crystallization nearly all extraneous substances are expelled from the crystal, was overlooked by sanitarians until recently. As Whipple says, "qualitatively the early bacteriologists were right; quantitatively they were wrong." In the formation of natural ice, most of the impurities are expelled into the waters of the pond or stream; and the same result is attained by the newer methods of artificial ice-making. By the "can" method, cans of water are immersed in the freezing mixture. As the freezing proceeds, the impurities are forced toward the center. In one of the newer methods, large cans are used, and the cakes of ice are cut into smaller ones, eliminating the dirty core. By another new "can" method, the impurities are expelled into about 6 inches of water kept liquid by agitation. In the "plate" method, the water is contained in large tanks, on one side of which are pipes containing the freezing mixture. The water freezes next the pipes in plates about 11 inches thick, and the impurities are expelled into the water beyond.

Some natural ice is undoubtedly derived from polluted rivers or ponds. Three great factors tend to purify ice from polluted waters: The first, as just mentioned, is crystallization. The second is temperature—the fact that freezing destroys a large percentage of bacteria. The third and most important is time. The longer the time intervening between the infection of water and its use (as water or as ice), the slighter the chance of the survival of the germs. On this score, natural ice, which is collected and stored for several months before shipment, has the advantage over artificial ice, which is usually marketed soon after it is made. Owing to these three factors—crystallization, temperature, time—clear, clean ice is of itself as free from danger as could be wished. Artificial ice made from pure water in clean, sanitary factories may be regarded as safe; so also may natural ice cut from reasonably pure deep ponds or lakes and stored under sanitary conditions. Artificial ice made from polluted water in dirty, insanitary factories is unsafe; natural ice cut from shallow polluted ponds or from grossly polluted rivers is also unsafe. Any dirty-appearing, cloudy ice may be infected as well as polluted; no such ice should be used in contact with food or drinks. Ice which is otherwise safe may become infected by improper handling—by being dragged across dirty streets or sidewalks or distributed by unclean hands. This is the great source of danger. We may practically eliminate danger by avoiding the handling of ice with dirty hands, by washing the ice with pure water, and by using only clear ice.

Current Comment

RADIUM IN CANCER

The papers on radium therapy in this and recent numbers of THE JOURNAL,[1] in addition to being instructive in themselves, are indicative of the interest in the subject at the present time. Radium therapy is going through the period of enthusiasm that Roentgen-ray therapy experienced ten years ago. This is perhaps inevitable, and after it the method will doubtless settle into its true place in therapeutics. It is not a new discovery that radium has interesting and useful possibilities. That was shown by Wickham and others several years ago. Indeed, we know enough from our experience now to predict with considerable assurance the extent of these possibilities. Radium is useful in numerous dermatoses; and, passing to the larger subject of cancer, it is indisputable that radium can be used successfully to destroy certain localized malignant growths, that is, growths on the surface whose entire extent can be sufficiently exposed to its energy. Extensive growths involving deep structures and disseminated growths are beyond its control, and there is no reason to believe that they will ever be brought within its control, for all experience with radium and the Roentgen rays has shown that these agents are useful in malignant growths only so far as they can directly destroy the cancerous tissue. In fact, there is every reason to believe that the extent and the limitations of therapeutic usefulness of the two agents are essentially the same, as are, indeed, the actinic energies of each. We have, then, a considerable experience on which to base our estimate of the usefulness of radium therapy, and from this experience there is no justification for the promise of relief in extensive cancer from the use of radium, or for the hope that with large quantities of radium we would be much nearer the solution of the problem of the cure of cancer in general than we are now. Radium has a useful therapeutic field, and it would be unfortunate for its therapeutic reputation to be damaged by exaggeration or injudicious enthusiasm.

A CURIOUS CUSTOM OF THE PARIS MEDICAL FACULTY

The historians of French medicine, Maurice Raynaud and others, have described at length the extraordinary amount of ceremonial (almost ritual) observances and banqueting which attended the graduation of Parisian medical students in the sixteenth and seventeenth centuries. Ernest Wickersheimer, librarian of the French Academy of Medicine, describes a singular custom of the old Paris Faculty

1. Tousey, Sinclair: A Case of Disseminated Carcinoma of the Breasts and Axillae Improved by Radium, THE JOURNAL A. M. A., April 11, 1914, p. 1167. Clark, A. Schuyler: Radium Treatment of Cutaneous Epitheliomas by Single or Massive Doses, ibid., May 9, 1914, p. 1453. Janeway, H. H.: Results of Radium in Cancer, ibid., May 30, 1914, p. 1707. Kelly, H. A., and Burnam, C. F.: Radium in the Treatment of Uterine Hemorrhage and Fibroid Tumors, ibid, Aug. 22, 1914, p. 622. Simpson, F. E.: Radium, Its Uses and Limitations in Skin Diseases, this issue, p. 737. Holding, A. F.: The Relative Value of Radium in Dermatology, this issue, p. 741. Newcomet, W. S.: Radium and the Roentgen Rays in Radiotherapy, ibid., this issue, p. 743.

in the second half of the fifteenth century.[1] It seems that once a year, toward the end of winter, after the last elective disputation of the scholastic year, that is, at the beginning of Lent, the master regents of the Faculty betook themselves to the public warm baths at the expense of the bachelors in medicine. This observance is first mentioned by the historians of the Faculty, Feb. 27, 1473. It has been passed over by all other historians and was lost sight of in the seventeenth century, Jean Riolan, in his "Curious Researches on the Medical Schools of Paris and Montpellier" (1651), construing the Latin expression for the bath-house charges (*pro stuphis*) as an expense for stoves in the lecture rooms. The object of the custom was to afford a little recreation to the master regents, fatigued by the lengthy winter disputations, and of course, to make the festival complete, the visit to the baths was followed by a supper. In 1493, both bachelors and beadles were permitted to accompany the masters to the baths, and the same thing would have happened in 1499 had a bachelor not withdrawn, "an unbidden guest, because his bath bill had not been discharged." In February, 1496, it was still too cold for the Lenten tubbing; and in 1500, an epidemic of "inguinagra" (syphilitic bubo) was sufficient to scare the masters away from the baths, as happened in the case of the common bath pools of Germany in the same period. Wickersheimer states that this custom did not take root very deeply, and often the Faculty preferred to put the money obtained from the students *pro stuphis* to more practical uses. In 1479, the sum obtained was applied to the construction of schools; later, it was partly distributed among the master regents to liquidate the expenses of the banquets which always followed the disputations. From 1508 on, the amount collected was turned over to two master regents who had been designated as lecturers or readers (*lecteurs*).

1. Wickersheimer, E.: Gaz. d. eaux, Paris, 1914, lvii, 751.

AMERICAN VERSUS EUROPEAN POSTGRADUATE WORK

One of the compensations of the present European war is that it may compel Americans to seek out, to appreciate and to encourage a further development of the resources of their own country. Tourists who in other years sought the Swiss Alps will have time to see Colorado, California or Alaska; art patrons, deprived of the opportunity of buying dubious "old masters," will have a chance to do a real service to art by encouraging living native artists; students of music in the habit of studying abroad will be compelled to study at home, thereby bringing into prominence and encouraging better teaching in this country, and, last but not least, the multitude of physicians, compelled to break the habit of going to Paris, Berlin and Vienna for advanced medical instruction, may discover and call attention to the excellent facilities for postgraduate instruction in the United States. This is a good time to repeat what we have said before: that this country offers opportunities for postgraduate medical instruction equal to those afforded abroad, and some that are superior, especially for American students. Foreigners have begun to appreciate the advances made in this country; we have had distinguished foreign visitors who came to learn, for instance, from American scientific work, hospital organization and surgery. It is true that, in the past, postgraduate instruction has not been so well organized in the United States as abroad. It has been said, also, to be rather expensive. Both of these objections are now being removed, with the organization of postgraduate instruction under university auspices in addition to other opportunities for postgraduate work. For instance, the Harvard Graduate School of Medicine offers for its summer term this year nearly two hundred different courses, including courses in all the numerous minor subdivisions of laboratory and clinical instruction. Tulane Unversity, Louisiana, which also offers instruction to postgraduate students, is exceptionally situated in being able to give instruction in tropical diseases. Physicians whose plans for summer work have been deranged by the hostilities in Europe may have no reason to regret the enforced change if they employ their time wisely in America. On the whole, especially when the difference in the cost of travel is taken into consideration, a comparison of expense between American and foreign courses will be favorable to the former. Even before the present war broke out, it was acknowledged by men of high standing abroad that the future of medicine lies in America. It is to be hoped that one result of the interruption of communication between America and Europe may be that exaggerated prestige will no longer attach to one's having "studied abroad."

THE RADIO-ACTIVITY OF THE SARATOGA WATERS

In view of the fact that the sick of this and other countries have been extensively exploited in recent years by venders of so-called radio-active waters, the Bureau of Mines has done a public service by publishing the results of its examinations for radio-activity of the waters of Saratoga Springs, N. Y.[1] The results show that the activity of the different springs varies widely, some being more than twenty times as active as others. It is to be presumed that not even the most enthusiastic believers in the efficacy of radio-active waters would be inclined to attribute much remedial value to the radio-activity of even the strongest of them. Some are, however, much stronger in radio-activity than at least one of the widely exploited "radio-active" springs. Were the Saratoga Springs still in the hands of private individuals it is quite likely that these results would be exploited for commercial purposes. The work is stated to have been undertaken at the request of the commissioners of the state reservation at Saratoga Springs and, we assume, is published with their knowledge and consent. This procedure is far more creditable than that of the United States government in connection with the United States Reservation at Hot Springs, Ark.; the government has had the radio-activity of these waters

1. Moore, Richard B., and Whittemore, C. F.: The Jour. Indust. and Engin. Chem., July, 1914, p. 552; abstr., Propaganda for Reform Department, this issue.

determined on two separate occasions, but only the vaguest and most meager information has been allowed to become public—just enough, in fact, to enable the bath-house owners and the government itself to exploit the results and to deceive the tens of thousands of sick who yearly visit these springs.

THE WAR AND THE MEDICAL PRESS

An evidence of one effect of the war is the small size of our British exchanges. This might be expected for no other reason than the lack of material for publication. The *British Medical Journal*, however, in its issue for August 15, gives as another reason the shortage of paper, which it states has become a very serious difficulty for the periodical press. The *British Medical Journal* has omitted entirely its epitome of current medical literature because it has received no German, Austrian or Russian exchanges for the previous two weeks, and very few from France. In addition to the difficulty in securing paper, because of irregular sailing of the ships, the consumption of paper by the newspapers has increased enormously because of the demand for extra editions. THE JOURNAL has received practically no German, Austrian or Russian publications, and but few French or Belgian periodicals since the war began. The Berlin Letter—mailed from Charlottenburg, July 31—arrived in Chicago August 25, too late for publication in this week's issue. No Paris and Vienna letters have been received of dates subsequent to the onset of hostilities.

Medical News

ILLINOIS

Still in Europe.—Drs. Frank J. Otis, Moline, and Dr. and Mrs. Karl F. Snyder, Freeport, are detained in Europe.

Personal.—Dr. Herman C. Stevens has been appointed examining alienist at Cook County Institution, Oak Forest. ——Dr. Frederick W. Werner, Joliet, who has been critically ill with septicemia, is reported to be steadily improving.

Return from Abroad.—Drs. William L. Gray, Champaign; Heber Roberts, Belleville; Burdette E. LaDue, Ottawa; Ella Fitch Milligan, Ottawa; Mary L. Rosenstiel, Freeport, and Charles B. Horrell, Galesburg, have returned from abroad.

Bathing Beach Closed.—The State Board of Health through its secretary, Dr. C. St. Clair Drake, has ordered closed the bathing beach for one-half mile on each side of one of the principal hotels at Fox Lake, Lake County. The sewage from the hotel empties into the lake near the beach and a number of cases of typhoid fever are believed to have been due to this cause.

Tuberculosis Notes.—The first clinic in the history of the Oak Forest Tuberculosis Sanatorium was held August 20 by Dr. Ethan Allen Gray in the Fresh Air Hospital.——Dr. Daniel Lichty, president of the Rockford Municipal Sanitarium to be located on a tract of land east of Sinnissippi Park, suggests the name of Oak Park for the institution. The site is about 15 acres in extent and 100 feet above the river with an ample forest area.

New Health Department Plans.—Tentative plans for the consolidation of several overlapping state bodies under the general title of the State Health Department, were considered at Springfield, August 19, at a conference of public health officials and others. The plans provide a state health department with a salaried health commissioner and an unpaid state board of health. The department is to include bureaus of vital statistics, foods, drugs, sanitary inspection, boards for the examination and licensing of physicians, pharmacists, dentists and nurses with power to revoke licenses subject to review by the state board. The department is to be given sanitary control over barbers.

Chicago

Home from Europe.—Drs. Thomas J. Watkins and wife, Dr. Isaac J. Abt, Dr. Charles H. Solomon and Dr. Charles Gilbert Davis have returned from abroad.

Chicagoans Abroad.—Dr. Franklin H. Martin has reached London after an automobile trip from Munich.——Dr. Lloyd B. Crow, who has been studying in the Broussais Hospital, Paris, has gone to Fumay, a town on the French border near Namur and is caring for the wounded.——Dr. Robert J. Rize, with his wife and two children, has reached London after a trip through that portion of Belgium occupied by the German troops.

Personal.—Dr. Otto W. Lewke and daughter have returned from a tour of Alaska and the Canadian Rockies.——Dr. Harry M. Richter, who has just returned from Europe, delivered a lecture, August 21, in the amphitheater of the Maimonides Hospital on "Some Modern Advances of Medicine and Surgery," illustrated by stereopticon views. Similar gatherings are held at the hospital monthly, to which the medical profession is cordially invited.

Safety First Propaganda.—The coroner of Cook County has decided to issue the *Coroners' Safety Bulletin* weekly. The first issue deals with drowning and forecasts that one hundred and fifty-six persons will be drowned in Cook County during the year unless the educational campaign for public safety decreases this record. These figures are exclusive of suicides by drowning, of which twenty-two occurred last year. The greater part of the drownings reported to the coroner's office are during recreation or on picnics and the coroner urges that every child should be taught to swim and encouraged to enjoy it and that the sense of caution, prudence and calculation should be stimulated to the highest point for the maintenance of physical strength and alertness to overcome and escape danger, and the employment of judgment and alertness to avoid situations that are perilous to one's self and to others. This should include also training in first-aid, with special reference to drowning. The second bulletin is to be on accidental poisoning.

INDIANA

Loan to Health Board Authorized.—The city council of Indianapolis on July 28, authorized a temporary loan of $77,000 for the use of the City Board of Health.

Indiana Physicians Abroad.—Dr. and Mrs. Franklin S. Crockett, Lafayette, Dr. Charles Melvin Mix, Muncie, and Dr. Manford M. Clapper, Hartford City, are detained in Europe on account of war conditions.

Home from Abroad.—Dr. and Mrs. G. Frank Holland, Bloomington; Drs. J. Rilus Eastman, William F. Clevenger and Thomas C. Hood, Indianapolis; Dr. Marcus Ravdin, Evansville; Dr. and Mrs. Harvey H. Martin, LaPorte, and Dr. Charles O. Bechtol, Marion, have returned from Europe.

Investigation of Insanity.—At a conference held in the office of the governor, August 7, the rapidly increasing number of insane, epileptics and other defectives in Indiana was discussed and the governor suggested the appointment of a commission to study the question, and stated that he would ask the legislature for authority to appoint such a commission.

State Association Meeting.—The annual meeting of the Indiana State Medical Association will be held at Lafayette, September 23 to 25. The sessions of the association will be held in the Y. M. C. A. Building and the Second Presbyterian Church. The Sunday before the meeting will be observed as "health day" and the pulpits of the city will be filled by members of the association.

Cause of Typhoid in Indianapolis.—The City Board of Health, Indianapolis, in investigating the typhoid situation in that city, found that fourteen cases were due to the careless handling of empty milk bottles. A family in which there was typhoid fever bought milk at the grocery and returned the empty bottles to the grocer, these were again filled by the dairy man and returned to customers, resulting in a large number of new cases.

Disease Prevention Day.—Arrangements are being made for the observance throughout the state of disease prevention day on October 2. Special emphasis is to be placed on the prevention of tuberculosis and representatives of the State Board of Health, Public Health Nurses' Association, State

Nurses' Association, State Medical Association, State Board of Education, State Society for the Prevention of Tuberculosis and State Federation of Clubs have been assigned positions on the initial committee of arrangements.

Society Incorporates.—The Indiana Society for the Prevention of Tuberculosis, filed articles of incorporation, July 28, in order to have legal authority to receive a bequest offered the society by an individual outside the state. The headquarters of the organization will be in Indianapolis and there will be a director for each congressional district of the state. The first board of directors is as follows: Mrs. George P. Decker, Evansville; Dr. Arthur A. Rang, Washington; Dr. Henry B. Shacklett, New Albany; Miss Mary Kennedy, Lawrenceburg; Prof. L. J. Rettger, Terre Haute; Dr. S. Edgar Bond, Richmond; Mrs. Jacquelin S. Holliday, Indianapolis; Miss Luella Anderson, Muncie; Dr. Fred A. Dennis, Crawfordsville; Dr. Otis B. Nesbit, Valparaiso; Mrs. E. W. Shirk, Peru; Dr. Eric A. Crull, Fort Wayne, and Dr. James A. Snapp, Goshen.

Personal.—Dr. Arvine E. Mozingo of the house staff of the Methodist Episcopal Hospital, Indianapolis, has been appointed to a similar position at the Metropolitan Hospital, Blackwell's Island, New York.——Dr. Darmon A. Rhinehart, instructor in anatomy in the Indiana University School of Medicine, Bloomington, has been appointed director of the anatomical department of the University of Arkansas, Little Rock.——Dr. Gilbert R. Finch, Center Point, was seriously injured by the overturning of his automobile, August 14.——Dr. Charles P. Hutchins, director of physical education at the Indiana University, Bloomington, has resigned and will practice in Rochester, N. Y.——Dr. Charles C. Morris, Rockville, has resigned the presidency of the Parke County Society for the Prevention of Tuberculosis.——Dr. Arnold Utterback, New Goshen, was painfully injured in an automobile accident, August 11.——Dr. Cassius E. Van Matre, Newcastle, is reported to be seriously ill with heart disease at his home.——Dr. Andrew W. Smith, Hammond, has been appointed director of athletics in Throop College, Pasadena, Cal.

KENTUCKY

Home from Europe.—Drs. John L. Phythian, Newport and John R. Murnan, Covington, reached home from Europe August 12.

Progress of Hookworm Campaign.—The State Board of Health reports that in the countries in which intensive health campaigns have been conducted under the auspices of the Board the doctors are on the lookout for intestinal parasites. They are certain that hookworm infection makes it practically impossible for the chronic diseases to get well on account of the decreased blood-supply. Of especial interest is the almost universal observation that, if uncinaria is diagnosed within the first few weeks of its first attack, except in the very severe cases, the patient usually recovers if promptly treated with thymol and this treatment is repeated at intervals of ten days until results are secured. Up to Jan. 1, last, the physicians of the state had reported the treatment of 45,470 cases of hookworm disease.

LOUISIANA

Lepers Discovered.—Four lepers were discovered in an isolated part of Arcadia Parish by Dr. Hines C. Webb recently and the unfortunate patients were sent to the State Leprosarium, White Castle.

Home from Europe.—Drs. Samuel M. D. Clark, Felix A. LaRue and Charles A. Borey, New Orleans, have returned from abroad.——Drs. Charles L. Chassaignac, C. Jeff Miller, Gustav Mann and Otto Joachim, New Orleans, are reported to be still abroad.

Personal.—Dr. Andrew G. Friedrichs, for many years dean of the dental department of Tulane University, New Orleans, has resigned and has been succeeded by Dr. Wallace Wood, Jr.——Dr. Marcus J. Magruder, New Orleans, has been appointed a member of the board of administration of the Tulane University.——Dr. Joseph Conn, New Orleans, who was a passenger on the *Kronprinzessen Cecilie* on her memorable voyage, which ended at Bar Harbor, Maine, is sojourning at Clifton Springs, N. Y.——Dr. Isadore Dyer, dean of the Tulane Medical School, is taking a trip to Havana, Cuba.——Dr. Oscar Dowling, New Orleans, has been appointed chairman of the committee on vital resources of the National Conservation Congress.

Results of Hookworm Canvass and Campaign.—Dr. Sidney D. Porter, state director of the hookworm commission, has issued a report of the two weeks' campaign in Tangipahoa Parish and the survey of the parishes of St. Helena, Washington, Livingston and St. Tammany. In the latter four parishes 5,397 microscopic examinations were made, and 52 per cent. found infected. In Tangipahoa 1,128 examinations were made, and 51.3 were found infected. In the preliminary campaign in the parish 1,228 patients were treated. No doubt is felt that insanitary conditions have caused the reinfection of many patients treated in the campaign three years ago. Since the inauguration of work in the state, 49 parishes have been surveyed and free dispensaries operated in 43, which has resulted in the treatment of 47,614 cases.

MASSACHUSETTS

Physicians Abroad.—Drs. Rufus A. Kingman and Calvin B. Faunce, Boston, have been defained in Europe by reason of the war.

Home from Europe.—Dr. and Mrs. Frank C. Granger, Randolph, Dr. George L. Richards, Fall River, and Dr. Fred B. Lund, Boston, have returned from Europe.

Physician Donates House for Hospital.—Dr. Charles S. Holden, Attleboro, has donated a summer home near Norton with the stipulation that it be used for a tuberculosis hospital for Attleboro.

Personal.—Drs. Sarah E. Coppinger, Needham Heights, and Thomas J. Scanlan, Boston, are the medical members of the board named by the governor to take charge of the Foxboro Hospital since its separation from the Norfolk State Hospital. At the first meeting of the board, Dr. Coppinger was elected secretary.——Dr. Charles F. McCaffrey, Somerville, has been appointed medical examiner of Middlesex County.

MINNESOTA

Home from Abroad.—Drs. Edwin Moren, Olaf J. Veline and Arthur E. Benjamin, Minneapolis; Dr. Louis A. Fritsche, New Ulm, Dr. Alfred E. Comstock, St. Paul and Dr. and Mrs. Edward W. Humphrey, Moorehead, have returned from abroad.

Minnesota Physicians Abroad.—Dr. and Mrs. Theodore L. Chapman and Dr. and Mrs. Robert Graham, Duluth; Dr. and Mrs. James L. Lynch, Winona, and Dr. John W. Lee, Minneapolis, are reported to be detained in Europe on account of war conditions.

Personal.—Dr. Thomas C. Clark, Stillwater, has been appointed chief surgeon of the Minnesota Soldiers' Home, Minnehaha Falls.——Dr. Arthur E. Benjamin has been appointed a member of the Minneapolis Board of Charities and Corrections.——Dr. William E. Harwood, Eveleth, has disposed of his hospital and will practice at his former home in Joliet, Ill.

Alleged Neglect in State Hospital.—On the recommendation of Dr. Henry M. Bracken, secretary of the State Board of Health, the governor has ordered an investigation of the State Hospital, Hastings, by the State Board of Visitors. Dr. Bracken's recommendation is said to be due to the failure of the hospital authorities to report cases of tuberculosis in the institution, although there were sixteen deaths from this cause in 1913, and there have been six deaths already this year from the same cause.

Southern Minnesota Physicians hold Summer Meeting.—The third summer meeting of the Southern Minnesota Medical Association was held in Winona, August 20 to 21 under the presidency of Dr. H. F. McGaughey. On the first evening, the association was entertained at dinner by the Winona County Medical Society and the medical profession of Winona. At this function, one hundred and thirty were present. At the first session, held after the banquet, Dr. William J. Mayo, Rochester, delivered an address on the "Influence of European Surgeons on American Practice" and Dr. Henry M. Bracken, Secretary of the State Board of Health, read a paper on preventive medicine. On the second day, a large number of papers were read and after luncheon, the members of the association were the guests of Drs. William J. and Charles H. Mayo, for an excursion on the steamer *Oronoco*. During the river trip, a session of the society was held.

Sanatorium Notes.—Representatives of Lincoln, Lyon, Pipestone, Murray, Cottonwood, Rock and Nobles counties, met in Tracy, August 8 to consider the establishment of a joint county tuberculosis sanatorium. A committee was appointed to examine three proposed sites, one at Lake Shatek, one near Windom and a third near Worthington.

——Plans are being prepared for the Clay-Becker County Tuberculosis Sanatorium at Sand Beach Lake. The building is to cost $25,000 and an additional sum of $10,000 will be appropriated for the equipment of the heating plant, lighting system, etc.——A sanitarium is to be erected by Beltrami, Hubbard and Koochiching counties, to cost $35,000; the building is to be erected at Bass Lake and the governing board is composed of seven members, three from Beltrami and two each from the other two counties.——Dr. Albert J. Chesley, Minneapolis, epidemiologist for the City State Board of Health has commenced a campaign of education and arguments to influence the county commissioners to take advantage of the state law for the erection of city-county tuberculosis sanatoriums.——It is announced that Goodhue County will erect a tubercu'osis sanatorium on the shores of Lake Billsby, near Canon Falls.——The work on the sanatorium which was to have been built in Crookston, has been suspended because of the failure of the county commissioners of Polk County to make the one-mill levy, and the withdrawale of Norman County from the agreement.

MISSISSIPPI

Vaccines and Antitoxins.—At a recent meeting of the State Board of Health, it was voted to procure a supply of vaccines, antitoxins and serums to be distributed to the public at cost.

Personal.—Dr. Edward C. Parker, Gulfport, has returned from Europe.——Dr. L. S. Rogers, West, will take charge of the State Charity Hospital, Jackson, about September 1.——Dr. Edward R. Cook, Vicksburg, charged with manslaughter in connection with the death of Miss Rosa Grant, was exonerated July 25.——Dr. Rives A. Manker, Long Beach, has been adjudged insane and committed to the State Hospital.——Dr. Noel C. Womack, Jackson, has been appointed a member of the State Board of Health, vice Dr. Giles S. Bryan, Armory, resigned.

MISSOURI

City Rents Isolation Hospital.—The city of St. Joseph has rented at a cost of $60 a month, the sanatorium of Dr. William L. Wittington at Twenty-Third and Sacramento Sts. The institution is to be used as an emergency hospital for communicable diseases.

From, to, and in Europe.—Dr. Clarence B. Francisco and Dr. Jabez N. Jackson, wife and daughter, Kansas City; Drs. Floyd H. Spencer, Joseph J. Bansbach and Louis J. Dandurant, St. Joseph, have returned from Europe.——Dr. Alex Van Ravenswaay, Boonville, has returned to Holland for war service.——Dr. Evan S. Connell, J. Elliott Royer, Albert J. We'ch and Joseph E. Sawtell, Kansas City, are awaiting an opportunity to sail for the United States.

St. Louis

Personal.—Dr. Keating Baudoy is reported to be ill in the State Hospital from an overdose of paraldehyde.——Drs. John F. Gallagher and R. Lee Dorsett have been appointed assistant po.ice surgeons.

In and from Europe.—Drs. James C. Whitley, Harriet H. Stevens and Lionel S. Luton are detained in Europe on account of the war.——Drs. Frank Ring and Joseph L. Emil and Julius Boehm have returned from Europe.

Lung Clinic Open.—A clinic for diseases of the lungs has been established at St. Marys Dispensary, by the St. Louis Society for the Relief and Prevention of Tuberculosis and the St. Louis University. The clinic is in charge of Dr. Andrew C. Henske and is open from 12 to 1 o'clock on Mondays, Wednesdays and Fridays.

NEBRASKA

The State Association Meeting.—Dr. Joseph M. Aiken, Omaha, secretary of the Nebraska State Medical Association, announces that the next annual meeting will be held in Hastings, May 18-20, 1915.

Nebraskans in Europe.—Dr. Oscar S. Hoffman and wife, Omaha, reached London August 4.——Drs. George A. Stevens, Frank M. Conlin, William N. Anderson, Joseph M. Shramek, Omaha, who reached Paris on their way to Vienna, sailed from Liverpool for this country, August 15.——Dr. E. Willard Powell, Omaha, has returned from Europe.——Dr. Palmer Find ay, Omaha, sailed for home, August 23.

Personal.—Dr E. Dolphus Haysmer, Washington, D. C., has accepted the position of surgeon and superintendent of the Nebraska Sanitarium, Hastings.——Dr. Frederick A. Sedlacek, Omaha, has been appointed vice-chairman of the State Prison and Parole Boards.——Dr. Joseph F. Borghoff, Omaha, has been appointed a member of the staff of the St. Francis' Hospital, Butte, Mont.——Dr. George Tilden, for forty years head of the Douglas County Commission, has resigned and has been succeeded by Dr. Samuel K. Spalding.——Dr. Adam R. Ray, who has purchased a ranch near Brownlee, and is about to leave Fairfield, was the guest of honor at a dinner given recently by the Clay County Medical Association.

NEW YORK

New York Physicians Abroad.—Dr. and Mrs. Grant C. Madill and daughter, Ogdensburg, and Dr. Jane N. Baldwin, Poughkeepsie, are in London awaiting opportunity for passage to this country.

Personal.—Dr. Howard L. Van Winkle, Syracuse, is first on the list of eligibles to be certified by the State Civil Service Commission for permanent appointment as bacteriologist of Onondaga County.——Dr. C. Grace Carroll, who is temporarily filling the position, also passed the examination for this position.

The Carmody Drug Decision.—In an opinion handed down on August 19, Attorney General Carmody holds that the name of the physical purchaser of a habit-forming drug and not the person for whose use it is intended must be taken at the place of sale. He a.so states that a physician must not only write out a prescription when administering, but must do so when dispensing a habit-forming drug.

Course in Hygiene and Preventive Medicine.—Albany Medical College announces a special course in hygiene and preventive medicine which shall have special reference to the needs of the general practitioner, and in addition the State Department of Health has consented to deliver a series of twenty lectures on subjects re'ated to hygiene and preventive medicine, especially on the relation of bacterio.ogy to public health and the control of communicable disease. The special lecturers announced are Drs. Hermann M. Biggs, Linsly R. Williams, Augustus B. Wadsworth, Cressy L. Wilbur and C. E. A. Winslow.

New York City

Return from Europe.—Drs. Adolph Rostenberg and George David Stewart, Dr. Morris Manges, Dr. and Mrs. E. J. Bissel, Dr. and Mrs. Charles N. Dowd and Drs. Henry W. Frauenthal and Alfred A. Herzfeld have returned from Europe.

Typhoid on Hart's Island.—On August 12 a case of typhoid fever appeared in the workhouse on Hart's Island and on the 21st it is reported that there are twelve cases in the workhouse and two in the reformatory. The island has been isolated by order of the Board of Health and no prisoners will be permitted to leave for the present.

Physical Tests in the Health Department.—As attesting the good faith of his conviction that regular periodic physical examination of all employes is both practicable and advantageous, Dr. Sigmund S. Goldwater has himself submitted to a physical examination as have also 300 employees of the Health Department. Of this number 95 were found to have physical defects of more or less serious nature. It is believed that about the same proportion will be found to exist in any other body of employees.

OHIO

Home from Abroad.—Dr. John V. Gallagher, wife and four children, Cleveland, and Dr. and Mrs. Birt E. Garver, Loraine, have returned from Europe.

Bureau of Child Hygiene for Cleveland.—Dr. Clyde E. Ford, commissioner of public health, has asked for an appropriation of $11,400 to establish a bureau of child hygiene, and has asked for a total increase of $23,000 in his annual appropriation.

Trachoma.—The eye hospital in East Youngstown, started by Miss Mary Runyan and Mr. J. Clyde Campbell, is continuing to treat a number of trachoma cases which have been occurring in the various industrial plants of the city of Youngstown. The results so far have been good.

Antismall-pox Campaign at East Youngstown.—Vigorous measures are being taken in East Youngstown to combat the spread of small-pox. Every pupil will be vaccinated as soon as school reopens. The health officer, Dr. Amos B. Sherk, declares there is little real opposition to vaccination among the people.

Public Health Nurses.—Miss Bertha Bronson has been appointed public health nurse to the city of Lorain. Funds for this purpose were furnished by the city council.——Akron is to have a public health nurse, who will also act as health inspector. The expense will be borne by the Summit County Health Protective Society.

Public Health League Membership Increases.—A recent campaign and canvass started by the Urbana Public Health League resulted in the enrollment of 350 members. The total membership has now reached 554. Many organizations and lodges have sought membership and Urbana factories and stores are giving the league their moral and financial support.

Condemns City Prison.—The Board of Health of Circleville had declared the city prison unfit for use on many occasions because of unsanitary conditions therein, but nothing had been done to remedy the conditions. Finally, at its last meeting, the board prohibited the use of the prison. There are many other such prisons in Ohio requiring action by boards of health.

State Board Laboratory Moves to University.—In furtherance of Secretary E. F. McCampbells's plan to promote closer cooperation between the various state departments and the state university, the laboratory of the State Board of Health will occupy one of the buildings on the campus, at present being remodeled for its use. The laboratory, now situated in the Hartman Building, is being dismantled and set up in a building formerly used by the botany department at the university.

Personal.—Dr. William C. Mendenhall, Trotwood, who was struck by an electric car at Crown Point, August 13, is reported to be in a serious condition at St. Elizabeth's Hospital, Dayton.——The office of Dr. Eugene C. Beam, Columbus, was destroyed by fire, August 4.——Dr. Millard F. Hussey, Sidney, has been reappointed a member of the board of trustees of the Lima State Hospital.——Dr. Ernest Crockett, Ashtabula, has been elected coroner of Ashtabula County, vice Dr. Robert J. Baxter, Conneaut, resigned to become postmaster of the city.——Dr. Fremont M. Marshall, for three years health officer of Coshocton, has resigned.

PENNSYLVANIA

Personal.—Dr. Henry B. Burns has been appointed head of the department of school hygiene of Pittsburgh.——Dr. Wallace R. Hunter, Erie, has been reappointed trustee of the Warren State Hospital.——Dr. and Mrs. Schaffer, Allentown, have returned from Europe.

Reading Infant Mortality Reduced.—Through the efforts of the Visiting Nurses' Association of Reading, the mortality rate among infants in that city has been greatly lowered. The Fresh Air Home for Babies at Antietam, a few miles below the city and one of the many baby saving stations conducted by the association, has done much toward reducing the number of deaths of infants. Already more babies have been treated than last year when the total number in the care of the association reached 150.

Philadelphia

Hospital Superintendent Dies.—Rev. William Service Steen, for sixteen years superintendent of the Presbyterian Hospital, died August 12.

Care of Babies to Be Part of School Curriculum.—At the last meeting of the Board of Education, a motion was passed which made the teaching of methods to be employed in the care of babies a regular part of the work to be followed in the domestic economy course in the elementary schools. This subject will hereafter be taught in nine of the present housekeeping centers of the public schools and if successful the course will be extended throughout all grades of the elementary schools.

Personal.—Dr. Walter L. Pyle has sailed for South America.——Dr. William L. Rodman has returned from Europe and a number of others are reported to be on their way, among them Dr. E. E. Montgomery, on the *Adriatic*, which left Queenstown, August 21, and Dr. John H. Girvin, on the *Olympic*, which sailed from Liverpool, August 22.——Dr. Constantino N. Ciavarelli, who has just returned from Italy, was the guest of honor at dinner given by his fellow countrymen of this city August 21.——Dr. Karl Schaffle of this city has been appointed deputy medical inspector of tuberculosis dispensaries succeeding Dr. Edward B. Shellenberger, Warren, resigned.——Dr. John E. B. Buckenham has been appointed acting chief resident physician at the Hospital for Contagious Diseases during the absence of Dr. Samuel S. Woody on vacation.

VIRGINIA

Home from Abroad.—Drs. Israel Brown, W. Levi Old and Starke A. Sutton, Norfolk, have returned from Europe.

The Care of Infants.—The State Board of Health has issued 40,000 pamphlets on the care of infants, illustrated by photographs containing detailed directions for the care of infants and the general principles for the modification of milk.

State Health Board Appointments.—The governor has announced the following reappointments to the State Board of Health: first district, Dr. Samuel W. Hobson, Newport News; second district, Dr. Otto C. Wight, Jarratt; eighth district, Dr. William M. Smith, Alexandria.

Personal.—Dr. J. O. Fitzgerald has been elected bacteriologist to the State Board of Health with Dr. Gray as his assistant.——Drs. Charles M. Labenberg, Charles V. Carrington and Ramon D. Carcin have been appointed the new board of pension examining surgeons of Richmond.

Bacteriologist to Resign.—Mr. Aubrey H. Straus, for five years bacteriologist of Richmond, has announced that he will leave the service of the city at the end of the summer to become associate professor of bacteriology and preventive medicine in the University of Virginia, Charlottesville.

WISCONSIN

Sanatorium Plans Approved.—Plans for the Winnebago County Tuberculosis Sanatorium have been approved and advertisements for bids have been made.

New Health Insignia.—The city ambulance of Racine is now decorated by a gold star within a blue circle instead of the red cross which formerly designated the character of its work.

Detained in Europe.—Drs. John M. Dodd, Ashland; Charles W. Giesen, Superior; John Durner, Milwaukee, and Flora A. Read, Fond du Lac, are believed to be detained in Europe on account of war conditions.

Home from Abroad.—Drs. Thomas W. Nuzum and Edmund F. Woods, Janesville, have returned from Europe.——Dr. Albert M. Farrell, Two Rivers, reached New York, August 16.——Dr. Frederick A. Kraft, Milwaukee, returned from Europe, August 10.

Personal.—Dr. John W. Coon, Milwaukee, formerly superintendent of the City Tuberculosis Hospital, Wales, has been appointed superintendent of the new Municipal Tuberculosis Hospital, Chicago. Dr. Glenford L. Bellis, Wales, obtained the highest mark of the Cook County Civil Service examination, July 29, for health physicians at the Cook County Tuberculosis Hospital, Oak Forest.

GENERAL

Eye, Ear and Throat Specialists to Meet.—The annual meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held in Boston, October 19 to 21.

Red Cross Offers Services.—The American National Red Cross has decided to offer its services to all nations involved in the European war. The secretary is at present in Europe and the international relief board is considering ways and means of rendering service. Ten hospital units each consisting of three surgeons and twelve nurses with complete equipment are said to be now ready to be sent to the European war zone.

The Plague at New Orleans.—Since the last report, two cases of provisional diagnosis, bacteriologically confirmed, of bubonic plague, have been made in the following cases: Case 18, Ching Sam, Mongolian, male, aged 72, residence, 911 Toulouse St., employed at the Chinese Restaurant, 916 Toulouse St., sick four or five days, found dead Aug. 16, 1914, diagnosis, septicemic plague. Case 19, Mary Hooper, colored, female, aged 40, residence, 1905 Bienville St., sickened August 14, removed to Isolation Hospital August 16, with right femoral bubo. Case 20, Louise Welsh (daughter of Mary Hooper), colored, female, aged 24, residence, 1905 Bienville St., sickened August 16 with left femoral bubo, removed to Isolation Hospital. Cases 55 to 64 of rodent plague have been reported up to August 22. During the week ended August 15, 101 vessels were fumigated; 12,705 pounds of sulphur were burned; 12,304 tons of outgoing freight were inspected; 21 clean bills of health and 7 foul bills of

health were issued in the outgoing quarantine department. In the department of overland freight inspection, 6,510 cars were inspected, 1,403 cars were rat-proofed, 5 cars were condemned and one rodent was killed in a car. The field operations for the week included 10,202 rats trapped; 33 premises fumigated; 57,955 poisons placed; 4,366 premises inspected; 1,624 notices served; 1,449 abatements and 117 dead inspected. At the laboratory 10,351 rodents were received and 9,001 examined. Of the rats, 37 were suspicious and in 17, the diagnosis of plague was confirmed. Since July 8, 44,135 rats have been examined.

CANADA

Canadian Surgeons for the Front.—While no official list of the Canadian Medical men attached to the militia has been published, it is understood that amongst others the following will be in the first Canadian contingent: LT.-COLONEL DUFF in command; Dr. John L. Chabot, M.P., Ottawa; Hon. Dr. Henri S. Beland, N. Joseph, Que. and Drs. Perry G. Goldsmith and J. Harvey Todd, Toronto.

Infant Mortality in Canada.—With a little less than one-sixth the population of New York, Montreal heads the list in Canada in infant mortality. It has three times the mortality per 1,000 that New York has. Recent statistics places it at 290 per 1,000 births. Brandon comes next with 269; Ottawa, 256; Winnipeg, 169; Hamilton, 173; Halifax, 204; London, 164. By provinces the deaths per 1,000 births are as follows: Manitoba, 149; Ontario, 131; Saskatchewan, 130; Nova Scotia, 111; Prince Edward Island, 104. It is surprising to see the new western cities heading the list.

Hospital News.—The Vancouver General Hospital which has for the past seven years expended at least $5,000 a year in the treatment of Hindus will make an attempt to collect this amount from some Hindu leader in that community, since the Hindus were able to raise $14,000 to pay charter money for the steamer *Komagata Maru*.——The new St. Justine Hospital for Children was recently opened in Montreal. It contains eighty beds, three public wards, one private ward and a dispensary.——An Industrial Home for the Blind is in course of erection at Notre Dame de Grace, Montreal.——The Union National Française, Montreal, is to build a hospital at Maisonneuve.——The Bruchesi Institute at Montreal in 1913-1914 had 3,285 patients attend its clinics, the total number of consultations being 14,042. The number of deaths from tuberculosis registered in Montreal for that fiscal year was 1,083.

Health Items.—The death-rate in Toronto from typhoid fever in 1913 was 10.4 per 100,000 of the population. If the cases contracted outside the city were deducted, the rate would stand at 5.3. This would be the lowest rate of any American city, with a population over 350,000, outside of New York. In 1910 the deathrate stood at 40.8.——The new addition to the Toronto filtration plant on the Island is to have a capacity of 60 million gallons. It is to be of the mechanical type known as the Ver Merh drifting sand filter. Toronto will be the first city of large size to install this system and it is expected to be one of the finest and most modern filtration plants in the world.——The Department of Health, Toronto, has made a thorough survey of all factories and industries in that city—1,294 in all. In 80 per cent. the conditions are fairly good, but in the remaining 20 per cent. the conditions were such as to call for immediate action on the part of the Department.

Nova Scotia Provincial Sanatorium.—The Nova Scotia Government established the Provincial Sanatorium at Kentville in 1904. The ninth annual report of the medical superintendent, Dr. A. F. Miller, states that during the year ended Oct. 31, 1913, there were sixty-four applications for admission and that of these thirty-eight were accepted. At discharge twenty-three of these were apparently cured, eleven arrested, two improved, whilst two only failed to respond to treatment. It has been found that when tuberculin is used patients do better while in the sanatorium, but little ultimate benefit is apparent. Accurate records of all patients have been kept since January, 1910. Since that time ninety-four patients have been received for treatment. Fifty-nine of these are now well and working; nineteen are not working; fifteen are dead; the condition of only one remains unknown. There is great need in the province for hospitals for needy patients. A weekly fee of five dollars is charged and the balance for maintenance is supplied by the Government.

Infant Mortality in Toronto.—In June the Department of Health inaugurated a new branch of its service, known as the Division of Child Hygiene with Drs. Alan Brown and George Campbell in charge. The appointments are in the hands of the professor of pediatrics in the University of Toronto and the Medical Officer of Health. Toronto now has a population of 510,000 of which 10,960 are under one year of age and 21,070 under two years. In 1897 the infant mortality totalled 664 when the population stood at 197,000. During the last five years it has been as follows: commencing with 1909—1,410; 1,420; 1,432; 1,584; 1,877. To care for the children in times of sickness there are the Hospital for Sick Children with 250 beds—baby wards, thirty cots. It has its own pasteurizing plant and supplies seven milk depots. The Infants' Home cared last year for 289, of whom 76 died during the year. St. Vincent's Home has an average of 100 cases in residence. The Haven, 61—nine died; The Sacred Heart Orphanage, inmates, 200. There are forty-two licensed baby farms. There are eight day nurseries, and numerous private organizations working for the infants. A floating sanatorium provides trips for about three hundred mothers and babies. The well-baby clinics number ten which will be increased to twenty-five in 1915.

LONDON LETTER

LONDON, Aug. 7, 1914.

The War: Medical Service

The greatest war which the world has ever seen has broken out suddenly and unexpectedly, yet there is every reason to think that the medical service of this country will be quite adequate for the work. Before the declaration, the navy, including its medical service, was completely mobilized. The medical officers of the reserve were called from their civilian duties. A number of surgeons have also been engaged for temporary service and senior students to act as dressers. Trained nurses have been called from a reserve organized by the matrons of the large hospitals for service in the naval base hospitals. Expert surgeons and anesthetists from the large hospitals are ready for duty as soon as the sick and wounded are landed from the hospital ships.

For the territorial force of the army, physicians have been called from civilian practice. Fourteen mounted brigade field ambulances, forty-two field ambulances and twenty-three general hospitals are available. Civilian physicians have responded to the call for service at home and abroad as temporary surgeons. Many private citizens have offered their residences for use as hospitals or convalescent homes.

THE CLINICAL CONGRESS OF THE SURGEONS OF NORTH AMERICA

(*Concluded from page 697*)

The Selection of Operation in the Treatment of Gastric and Duodenal Ulcers

Dr. A. von Eiselsberg said that symptoms of perforation of the ulcer into the general peritoneal cavity call for immediate operation, irrigation of the peritoneal cavity, closure of the perforation and in bad cases jejunostomy in addition for the purpose of administering nourishment. In the other complications of ulcer, such as hemorrhage, operation is in most cases better not done. In typical stenosis of the pylorus, especially when in the case of a long-standing ulcer no new symptoms have occurred, gastro-enterostomy is the operation to be chosen. Unilateral pylorus exclusion offers the greatest security in ulcer and its complications. For ulcer situated at a distance from the pylorus simple gastro-enterostomy is not so feasible as in cases of ulcer of the pylorus itself.

Hyperthyroidism

Dr. C. H. Mayo, Rochester, Minn., said that exophthalmic goiter is essentially a disease of a chronic character, presenting exacerbations and ameliorations of symptoms extending over a period of months or several years. The operative interference in cases resistant to treatment should be confined to injections of boiling water into the gland after Porter's plan to hasten improvement. In most of the severe cases a ligation is made first of the left upper pole only. Should the reaction following this be severe, the ligation of the right upper pole is indicated a week later, and thyroidectomy reserved until four months have elapsed, by which time these patients have made an average gain of 22 pounds, with great general improvement. However, if the reaction following the left ligation is not unduly severe, a partial thyroidectomy may be made at the second operation, the week following.

Typhoid Perforation

Dr. G. E. Armstrong, Montreal, pointed out the great difficulty in diagnosing. The first indication was usually pain, but it was absent in 25 per cent. of the cases. The symptom next in importance was change of expression, which was quite evident in the majority of the cases; 65 per cent. showed a definite alteration, 28 per cent. showed a gradual one, and 7 per cent. none. Tenderness was present in 88 per cent. and absent in 12. Rigidity was distinct in 85 per cent. and not in 15.

The Non-Operative Treatment of Carcinoma

Krönig of Freiburg was to have read a paper on this subject, but was recalled by the war. Dr. C. Jeff. Miller of New Orleans therefore gave his impressions of a visit to Krönig's clinic. He asked Krönig whether he was in favor of radiation treatment for early operable uterine tumors as well as for advanced cases, and was told that operation had been given up entirely. Roentgen-ray treatment was regarded as superior to hysterectomy for fibroids, though in women under 40 myomectomy was performed when feasible. Contrary to Bumm's statement that deep-seated tumors cannot be influenced by the Roentgen ray, Krönig believes that cancer of the stomach can be made to cicatrize, and even when there are secondary growths in the liver, retrogression can be brought about. Radium and thorium in large doses are also much employed by Krönig. He holds that large doses of radium strongly filtered have great possibilities in malignant disease in deep-seated organs. He uses large quantities of radium and thorium applied at a distance. For carcinoma of the cervix he does not apply radium through the vagina but from outside the abdomen. He does not believe in the implantation of radium into growths. Summing up, Dr. Miller said he was impressed by what he saw, but not convinced.

Dr. T. W. Eden of London admitted that the Roentgen rays were useful, but was less certain about radium. By the former a very beneficial effect may be produced though the disease may be advancing in the deeper tissues. The best promise of improved results is in the Roentgen rays combined with operation.

Mr. W. E. Miles of London never used radiant treatment but confined himself to operation. It is necessary to remove not only the organ affected but also the tissues through which spread has taken place and through which it will take place. In operating for uterine cancer the interiliac glands should always be removed whether obviously affected or not. If found infiltrated, the iliac glands should also be removed.

Dr. Joseph Bloodgood of Baltimore said that surgeons were so overwhelmed with the details of technic of extensive operations that they had not given sufficient attention to the beginnings of cancer. Cancer always gave warnings to its subjects and therefore a campaign of education should be undertaken. At the stage at which cases should be treated the mortality should be practically nil. Preventive treatment is all important, for cancer never develops in a healthy spot.

Marriages

Lucius P. Beck, M.D., Piedras Negras, Mex., to Miss Minnie E. Stephens of San Antonio, Tex., at Uvalde, Tex., August 3.

Isaiah E. Lawrence, M.D., to Miss Grace Vivian Coyle, both of Columbia City, Ind., at Detroit, Mich., August 11.

George Chauncey Wrigley, Jr., M.D., to Miss Marie A. Timm, both of Dixon, Cal., August 8, in Sacramento, Cal.

Joseph Daniel Heitger, M.D., Bedford, Ind., to Miss Katherine Georgina Everbach of Louisville, Ky., July 15.

Edward Lewis Teed, M.D., Lisle, N. Y., to Miss Nettie Knoeller of Hallstead, Pa., at Syracuse, N. Y., August 6.

William DeHart FitzHugh, M.D., Doe Hill, Va., to Miss Bessie May Wagner of Monterey, Va., June 30.

Ralph Homer Boice, M.D., to Miss Mabel Chatterdon, both of Sistersville, W. Va., August 12.

John Robert White, M.D., Lynn, Mass., to Miss Margaret E. Hale of New Haven, Conn., July 21.

Joseph Harold Friedman, M.D., to Miss Sarah Margulies, both of Brooklyn, N. Y., August 9.

Deaths

Eugene Alfred Smith, M.D. University of Buffalo, N. Y., 1887; a Fellow of the American Medical Association; adjunct professor of clinical surgery in his Alma Mater; attending surgeon at Buffalo Hospital and assistant at Charity Hospital; consulting surgeon to the German Deaconess, Riverside and Woman's hospitals; once major and surgeon of the 65th Infantry, N. G., N. Y.; for many years a practitioner of Buffalo; died at his home in Saranac Lake, N. Y., August 9, from tuberculosis, aged 49.

William G. Ralston, M.D. Medical College of Evansville, Ind., 1873; a practitioner of Indiana since 1845; surgeon of the Eighty-First Indiana Volunteer Infantry and later secretary of the enrollment board of the First Indiana District during the Civil War; later surgeon of the U. S. Marine Hospital at Evansville; a member of the Mississippi Valley Medical Association; said to have been the oldest practitioner of Indiana; died at his home in Evansville, August 11, aged 95.

Wesley Harris Sharp, M.D. University of Pennsylvania, Philadelphia, 1865; a Fellow of the American Medical Association and a charter member of the West Virginia State Medical Society; hospital steward in the Navy during the Civil War; one of the oldest and most respected physicians of West Virginia; died at his home in Parkersburg, August 5, from uremia, aged 71.

Edgar B. Smith, M.D. Detroit College of Medicine, 1887; a Fellow of the American Medical Association; professor of surgery in the Michigan College of Medicine and Surgery, Detroit; surgeon in chief of the Boulevard Sanitarium, Detroit; died at his home, August 11, from septicemia due to an operation wound received three weeks before, aged 52.

Wallace B. Amick, M.D. Hospital College of Medicine, Louisville, Ky., 1898; of Glenalum, W. Va.; a Fellow of the American Medical Association; physician to the Glenalum Coal and Coke Co.; while traveling on a railway velocipede with the paymaster of the company; was shot and killed by robbers, August 14, aged 39.

Edward P. Childe (license, Nebraska, 1891); for fifty-three years, and until 1913 a practitioner of Nebraska; a veteran of the Sioux and Blackfeet campaigns; for one term a member of the Territorial Legislature of Nebraska; died at his home in Seattle, Wash., recently, after a surgical operation, aged 78.

William Andrew Forster, M.D. Homeopathic Medical College of Missouri, St. Louis, 1888; professor of surgery in the Kansas City Hahnemann Medical College; for twenty-five years a resident of Kansas City, Mo.; died in Grace Hospital in that city, August 8, after a surgical operation, aged 58.

Liston Homer Montgomery, M.D. Northwestern University Medical School, Chicago, 1871; a Fellow of the American Medical Association; a veteran of the Civil War; secretary of the Ohio Society of Chicago; died at his home in that city, August 24, from cerebral hemorrhage, aged 66.

John Lazelle Sawyers, M.D. Northwestern University Medical School, Chicago, 1878; of Centerville, Iowa; a Fellow of the American Medical Association; died in Augustana Hospital, Chicago, August 10, ten days after an operation for appendicitis, aged 58.

George G. Graham, M.D. College of Physicians and Surgeons, Baltimore, Md., 1882; formerly an alienist of Pittsburgh, and a member of the staff of Dixmont Hospital for the Insane; died at his home in Santa Barbara, Cal., August 9, from heart disease.

Nathan Cash, M.D. College of Physicians and Surgeons, Keokuk, Iowa, 1865; a veteran of the Civil War and for nearly forty years a practitioner of Uhrichsville, Ohio; died at his home in that city, August 12, from cerebral hemorrhage, aged 74.

James P. Cox, M.D. Northwestern University Medical School, Chicago, 1904; of Jefferson, Wis.; a member of the Wisconsin State Medical Society; died at St. Mary's Hospital, Milwaukee, August 12, after an operation for appendicitis, aged 38.

John C. Hallam, M.D. Marion-Sims College of Medicine, St. Louis, 1899; a Fellow of the American Medical Association; for several years a practitioner of St. Louis; died at his old home in Centralia, Ill., August 13, aged 38.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

The Radio-Activity of the Waters of Saratoga Springs

The article by Richard B. Moore and C. F. Wittemore (*Jour. Indust. and Engin. Chem.*, July, 1914, p. 552), quotations from which are given below, is of special interest in view of the general confusion of ideas with regard to radio-active waters. The work described was done by these authors for the Bureau of Mines at the request of the commissioners of the state reservation at Saratoga Springs, New York, in order to determine to what extent the waters and gases evolved from them were radio-active. THE JOURNAL comments on the work editorially elsewhere.

"The work done involved the direct testing of the gases evolved from the springs for thorium and radium emanation; the examination of the waters: (*a*) for their total activity; (*b*) of a certain number for the activity due to dissolved radium salts; and the determination of the activity of the residues deposited by the springs, where such residues could be obtained. . . .

"The activity of any water may be due to the presence of (*a*) dissolved thorium or radium emanations, (*b*) dissolved thorium and radium salts. All mineral and deep well waters are more or less radio-active, but the activity is *usually* due to the presence of dissolved radium emanation, *not to dissolved radium salts*. Therefore, the fact that a water is radio-active has of itself little significance. . . . [Italics ours.—ED.]

"Tests on the activity of the evolved gases were made on the ground in the following manner: A glass funnel to which was attached a rubber tube connecting with a small rubber bulb in turn connected with one of the openings to an electroscope, was inverted over the spring at a point where the evolution of gas was greatest. By pressing the bulb, a continuous and fairly constant supply of the gases from the spring was passed through the electroscope. By stopping the flow of gas and immediately making a series of readings across the scale, each reading being of short duration, it was possible to ascertain whether the activity was entirely due to the presence of radium emanation. If thorium emanation was present, a very sudden drop in activity would be noticed and, after a few minutes, the curve obtained by plotting activity against time would flatten out, due to the decay of the thorium emanation. In no case was thorium emanation found in any of the gases evolved from the springs, the activity being entirely due to the presence of radium emanation. . . ."

In order to get the activity of the waters, samples which previously had been collected at the springs at a point nearest to the source of supply, were boiled in the apparatus designed by Schlundt and Moore[1] and the evolved gases containing the radium emanation were introduced into a standardized electroscope. "On account of the large amount of carbon dioxid contained in some of the waters it was found advisable to add a sufficient amount of C.P. sodium hydroxid before boiling. In order to differentiate between the activity due to radium salts in solution and that due to dissolved emanation, samples of some of the waters were treated with C.P. hydrochloric acid, boiled for fifteen minutes and then sealed in flasks and allowed to stand for a month. At the end of this period they were boiled in the usual way and from activity obtained it was possible to calculate the amount of radium salts in solution.

"Samples of deposits from some of the springs were also collected and fused with sodium carbonate according to the method of Strutt.[2]

"Column 2 in the table of results gives the activity per liter at standard temperature and pressure, of the gases evolved by the springs; Column 3 gives the total activity per liter of the water, and Column 4 the activity per liter of the water due to dissolved radium. Column 5 shows the activity of the material deposited either in or just around the outlet of the spring.

Spring	Temperature °C	Gas Radium per Liter Gram ×10⁻¹²	Water Radium per Liter Gram ×10⁻¹¹	Deposit Radium per gram Gram ×10⁻¹¹
	1	2	3	4	5
Emperor	9.7	22.1	7.0	6.8	....
Peerless	...	....	6.0	...	....
New red	10.0	8.0	4.3	...	....
Hathorn No. 1	10.2	21.3	14.2	4.2	76.9
Coesa	10.2	8.1	9.7	...	7.9
Hathorn No. 2	10.0	5.1	16.1	9.9	....
Hathorn No. 3	9.5	8.3	6.6	...	12.0
Geyser	9.7	3.4	3.9	...	1.7
Adams	11.0	11.7	12.2	5.1	8.8
Flat No. 2	10.5	3.7	5.0	...	6.5
Pump well No. 4	12.0	67.8	23.1	2.1	6.3
Island	...	....	11.8	...	10.5
Crystal Rock	10.0	84.7	88.0	0.9	....
New Shonts well	...	....	11.3	...	....

". . . The fact that the residues are radio-active shows that the waters contain dissolved radium salts in addition to dissolved emanation, but this fact is more precisely indicated by the results under Column 4. . . .

"The total activity of the waters is rather low, although that of the Crystal Rock spring is considerably above the average. The activity of this spring, however, is not exceptional. . . .

"Since these analyses were made, the hydrostatic level of the waters at Saratoga Springs has distinctly changed, owing to the cessation of the extensive pumping for commercial purposes which formerly took place. Accordingly, the flow of many of the wells has increased. Whether this has also affected the radio-activity of the water cannot be predicted with certainty."

1. Schlundt and Moore: Jour. Phys. Chem., 1905, ix, 320.
2. Strutt: Proc. Roy. Soc., 1906, (A), lxxvii 472.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted on request.

WHAT CONSTITUTES FIRST AID?

To the Editor:—We are having a controversy with a liability company as to what constitutes first aid in fracture cases. We maintain that this includes the reposition of the fracture and the x-ray pictures necessary for its successful reduction. The liability company says that radiographs cannot be included in first aid. Our attorney tells us that there has been no ruling on that point in this state. Please tell us the ruling in Illinois or adjoining state or advise us in any other way on this point (What constitutes first aid?), as we are inclined to make a test case of this rather than accept the niggardly offer of the liability company.

T. J. BILLION, M.D., Sioux Falls, S. Dak.

ANSWER.—What constitutes "first aid" is a question of considerable importance owing to the great increase of accident and liability insurance. So far as we are aware no judicial decision has been handed down defining "first aid"; but a brief reference to the manner in which the term came into general use will aid one in arriving at a clear understanding of the scope of its meaning. When a person is accidentally injured or suddenly taken ill it is perfectly natural for those about him to render any aid or assistance within their knowledge and power. The humanitarian principle underlying such service has been long recognized and has inspired the formation of societies of laymen, the members of which receive a certain amount of instruction in order that they may be better able to render such service in an emergency. These societies are usually called first-aid societies, the idea being to give aid pending the arrival of a physician or surgeon.

The importance of doing something to relieve the injured, and particularly in the case of wounds to protect them from infection as much as possible, has caused most industries, railroads, etc., to provide first-aid outfits and to have certain of the men instructed in giving first aid until the patient can be turned over to a physician, or can be removed to a settled place such as his home or a hospital. There can be no question that the service thus rendered by laymen in such emergencies is "first aid"; but now suppose the one nearest at hand to the injured is a physician, or suppose that some one with no other authority than that of trying to do something to aid one in trouble summons a physician. Does the physician give "first aid," and if so, what is included in "first

aid"? Should the patient require anything more than a momentary service it is perfectly evident that he must be removed to some suitable place such as his home or a hospital before any definite line of treatment can be undertaken.

Such temporary measures, then, as may be used to enable or to facilitate the removal of the patient to some settled place where a definite line of treatment may be instituted constitute "first aid," whether it be given by a physician or a layman. The fact that the physician's efforts may be more intelligent than the layman's does not change the principle.

When the patient has reached his home or a hospital, or other place, and is turned over to his own physician, or to the hospital surgeon, or wishes to continue the services of the physician first called, then "first aid" ceases, and definite treatment begins. In large cities many patients suffering with injuries are brought to a hospital without ever having received "first aid," unless the mere act of transporting them may be considered "first aid." After such a patient reaches the hospital he does not receive "first aid," but definite treatment is instituted; and by the mere fact that the first thing done for him is done at the hospital, that first thing does not constitute "first aid." "First aid," then, may be defined as the temporary measures carried out in emergencies by any one, layman or physician, preliminary to the institution of a definite line of treatment by the physician in charge.

With this conception of "first aid," it seems clear that the taking of roentgenograms and the permanent setting and dressing of fractures is not "first aid," but definite treatment.

CAUSE OF WHOOPING COUGH — VALUE OF PERTUSSIS VACCINE — SCARLATINA BACTERIN — INFECTIOUS AGENT OF SCARLATINA

To the Editor:—1. Is the *Bacillus pertussis* recognized as the cause of whooping cough?

2. Has the pertussis vaccine proved itself to be of value, prophylactic or curative?

3. Has the so-called scarlatina bacterin any right to carry that name, and is it of prophylactic or therapeutic value?

4. Has the infectious agent of scarlatina been demonstrated?

H. Haerem, M.D. Story City, Iowa.

Answer.—1. Yes; the Bordet-Gengou bacillus is recognized as the cause of pertussis.

2. Yes. Thus E. Mather Sill says: "The most recent and, to my mind, the most effective rational method of treating whooping-cough is by means of a vaccine made from a culture of the Bordet-Gengou bacillus. I have used this method of treatment almost exclusively for several years, and in all treated sixty-one patients with better results than I had previously obtained by means of drugs." It has been the general experience that when a child is already in the stage of incubation, the vaccine will not prevent the development of the disease.

3. The so-called scarlatina bacterin is said to consist of a mixture of killed streptococci from scarlet fever cases. The close association of the streptococcus with scarlet fever has been considered an indication for the use of antistreptococcus serum and the various vaccines and bacterins prepared from this organism.

4. No.

ARTICLES ON INFANT WELFARE

To the Editor:—Please suggest literature that would be of use in preparing an address on child welfare. R. S. I.

Answer.—In The Journal, Feb. 1, 1913, p. 388, a list of literature on the prevention of infant mortality was published. The following is a list of articles on other phases of infant welfare:

Van Ingen, P.: Recent Progress in Infant Welfare Work, *Am. Jour. Dis. Child.*, June, 1914, p. 471.

Favill, H. B.: Child Culture the Function of Organized Medicine, A. M. A. Public Health Series.

New York State Department of Health, *Health News*, April, 1914 (infant welfare number).

Adanie, J. G.: Child Welfare Exhibitions and Their Value, *Pub. Health Jour.*, July, 1912.

New York City Department of Health, Monograph Series, No. 4, September, 1912.

Baker, S. J.: The Division of Child Hygiene of the Department of Health of the City of New York.

Hollopeter, W. C.: The School Child's Breakfast, orig., The Journal Nov. 20, 1909, p. 1727.

Van Derschi, J. W.: An Investigation into the Conditions Surrounding the Child in School, The Journal, Nov. 20, 1909, p. 1725.

The Division of Child Hygiene and the Reduction of Infant Mortality in New York City, abstr., The Journal, Jan. 1, 1910, p. 72.

Physical Culture of Our School Children, Vienna Letter, The Journal, Jan. 15, 1910, p. 218.

Women and Children in Factories, Vienna Letter, The Journal, April 30, 1910, p. 1456.

Probst, C. O.: The Protection of Child Life, abstr., The Journal, July 16, 1910, p. 245.

Emerson, W. R. P.: Hygienic and Dietetic Treatment of Delicate Children by the Class Method, *Arch. Pediat.*, August, 1910; abstr., The Journal, Sept. 10, 1910, p. 968.

Hygiene of Childhood, London Letter, The Journal, Oct. 1, 1910, p. 1211.

Sill, E. Mather: Dietary Studies of Undernourished School Children in New York City, The Journal, Nov. 26, 1910, p. 1886.

Child Welfare Exhibits, Current Comment, The Journal, May 13, 1911, p. 1395.

Child Welfare Exhibit, a Presentation in New York and Chicago of Factors Influencing Childhood, General News, The Journal, May 20, 1911, p. 1490.

Straw, Z. L.: Child Welfare, abstr., The Journal, June 17, 1911, p. 1851.

ABSORPTION OF MEDICINES DILUTED WITH WATER

To the Editor:—1. Have there been experiments made which show whether absorption of medicines by the stomach is hastened or retarded by their dilution with water?

2. Would 1/32 grain pilocarpin taken in a glass of water be more slowly absorbed than if taken in 1 dram of water?

X. Y., Toledo, Ohio.

Answer.—1. According to most experiments, there is no absorption of water from the stomach, and hence medicines dissolved in water are not very likely to be absorbed from the stomach. Their rapidity of absorption depends, therefore, on the readiness with which the stomach empties itself into the duodenum. Liquids which are isotonic with the blood are rapidly discharged from the stomach into the duodenum; hence the dilution of a medicine with sufficient water to lower its osmotic tension and make it isotonic favors its discharge from the stomach and absorption by the intestine.

2. The degree of dilution of $\frac{1}{32}$ grain of pilocarpin in a dram of water is already so great that further dilution is not needed to favor absorption. A greater dilution would probably delay absorption somewhat because of the greater length of time before the liquid in which it is dissolved would be expelled into the duodenum.

SEALING OF MUSEUM JARS—PREVENTION OF MOLDS IN KAISERLING SOLUTION

To the Editor:—Referring to the query and answer on these subjects (The Journal, Aug. 15, 1914, p. 597), I should like to add my own practice and experience.

1. A satisfactory sealing mass may be made by adding boiled linseed oil to rosin till the resultant is a plastic mass at the highest atmospheric temperature it is to withstand. It should be warmed up till liquid enough to apply readily to the surfaces to be sealed, to which it should be applied thinly—just enough to secure uniform adhesion. So made and applied it holds well enough and at the same time is plastic enough to permit of easy unsealing for access to specimens, etc.

2. The prevention of mold, a persistent annoyance in warm, humid climates, has been accomplished, in my experience, best by the use of arsenic trioxid—it proves more satisfactory under the climatic conditions of the Gulf Coast than thymol. The water content of the preserving solution of Kaiserling may be made a saturated arsenical solution, apparently without detriment to color preservation.

W. F. R. Phillips, M.D., Mobile, Ala.

PUBLICATIONS ON BACTERIOLOGY

To the Editor:—Please give a list of medical publications (books or magazines) relating to bacteriology.

D. B. Taloon, Du Bois, Pa.

Answer.—

Jordan, E. O.: Text-Book of General Bacteriology, Philadelphia, W. B. Saunders Company, 1914, price $3.

Abbott: Principles of Bacteriology, Philadelphia, Lea & Febiger, price $2.75.

Hewlett: Manual of Bacteriology Philadelphia, P. Blakiston's Son & Co., price $4.

Muir and Ritchie: Manual of Bacteriology, New York, Oxford University Press, price $3.40.

Journal of Pathology and Bacteriology, Cambridge, England, per year $5.50.

Centralblatt für Bakteriologie, Parasitenheilkunde und Infectionskrankheiten, Jena, per year $3.75.

WATER-GLASS—EFFECT OF GASOLINE SMOKE

To the Editor:—1. What is the composition of "water-glass?" Has it any practical value in the preservation of eggs?

2. Have we any experimental evidence to show the deleterious effects of gasoline smoke on the animal organism (as in the concentration in which we find it along a boulevard on a hot, sultry, summer's evening?)

C. W. L., Denver.

Answer.—1. Water-glass is a solution of sodium silicate. Its value in preserving eggs rests on the function of excluding air.

2. No.

Book Notices

THE SENSORY AND MOTOR DISORDERS OF THE HEART. Their Nature and Treatment. By Alexander Morison, M.D., F.R.C.P., Senior Physician to the Great Northern Central Hospital, London. Cloth. Price, $2.50 net. Pp. 261, with 51 illustrations. New York: William Wood & Co., 1914.

This volume is an earnest and dignified effort to set forth the importance of considering the nervous mechanism of the heart when attempting to understand the working of this organ in health or disease. Morison believes that the myogenists have been overenthusiastic in their claims. Not only does the ordinary muscle of the heart show nervous structures, but such specialized areas as the sinu-auricular node, Tawara's node, the bundle of His, and the wall of the coronary arteries are rich in nervous tissue whose function must surely be reckoned with. He is also not convinced that the atrioventricular node and bundle are purely vestigial remains of embryonic tissue; he believes that they have participated in the progressive development of the heart, growing and exercising their own special functions. His study of angina pectoris has led him to the belief that its causes may be various. He refuses to commit himself to any single theory of angina pectoris. The condition of the blood, of the nerves, the vessels, the muscle, may all be contributing factors. In fact, he believes that in many instances there are operating several causes constituting a "compound angina pectoris." So he is able to agree with those who regard the cause of the stenocardiac attacks as due to coronary obstruction, coronary spasm of the heart-muscle and stretching of the muscle from dilatation, and with those also who regard the pain as neuritic, neuralgic, aortitic, etc. His discussion of the prognosis and treatment is clear and sane. He is evidently not inclined to use digitalis in angina so freely as some others, who, it seems to us, are in the right. There is a brief consideration of some of the disturbances of cardiac rhythm. This gives Morison another opportunity to emphasize the importance of the nerve-control of the heart. He also reveals his skeptical attitude toward some of the more recent views in cardiology. For instance, he doubts the usual interpretation of auricular fibrillation. The tachy-arhythmia of the ventricle may be the cause and not the effect of the perverted auricular action (pp. 182, 222, etc.). He discusses heart-block enough to let one know that he thinks there are some things about it that are not yet proved. Altogether the book is an interesting contribution to the literature of heart-disease. The results of Morison's clinical experience are here set forth as well as epitomes of numerous post-mortem examinations in instructive cases that he has studied during life. From each one of these cases the author tries to draw some lesson bearing on the anatomy, physiology or pathology of the heart, and such studies are always of value. Morison is—to use a political expression—a stand-patter, a reactionary. He fights shy of the electrocardiograph and interpretations based on it. The older methods are good enough for him. We enjoy his well-worded thrusts at the progressive cardiologist, and must acknowledge that some of them strike home; but at the same time we feel that the sum total of his criticism, sincere as it is, is rather in the direction of retarding than advancing a knowledge of the truth.

DIE LOKALISATION IM GROSSHIRN UND DER ABBAU DER FUNKTION DURCH KORTIKALE HERDE. Von Dr. Med. C. v. Monakow, Professor der Neurologie, Universität in Zürich. Paper. Price, 48 marks. Pp. 1033, with 270 illustrations. Wiesbaden: J. F. Bergmann, 1914.

In this book the author of the well-known classic on *Gehirnpathologie* gathers together his scattered writings on brain localization and functional disturbances caused by lesions of the brain cortex, and molds them into a homogeneous whole. We can safely predict that the book is destined to become a source of inspiration to all who are interested in any branch of neurologic science. The author begins with general remarks on the symptomatology of lesions in the brain cortex, and points out that the initial symptoms of a lesion limited in extent are often entirely out of proportion to the amount of tissue involved, but seem to originate in centers remote from the seat of the lesion. This phenomenon as well as the gradual or rapid subsidence of many of the symptoms he believes to be due to the so-called process of "diaschisis," in support of which theory this book was written. By the term "diaschisis" Monakow means essentially "that shock-like cessation of function in nerve-centers widely separated in location but physiologically related in some manner and usually functioning synchronously with the center in which the lesion has occurred." He thus explains the multiformity of symptoms following a lesion in a known brain area and the gradual recession of many of the symptoms: diaschisis having passed off, there remain only the symptoms actually caused by the anatomic change in the brain. Monakow is thoroughly convinced that his theory will account not only for the many hitherto unexplained phenomena which follow a lesion of the brain, but also for the restitution of certain lost functions. He does not accept the assumption of "vicarious and compensatory action of parts of the brain not disabled for those unable to carry on their work." To him this theory is not supported by facts. Likewise he doubts the existence of strictly circumscribed physiologic brain territories. With the exception of the most elementary processes in the sensory sphere, there is to him a physiologic overlapping of most of the brain functions. In the subsequent chapters the author reviews the experimental and clinical work on the localization of motion, sensation and the special senses, as well as the interesting and yet obscure topics of agnosia, apraxia and aphasia. Everywhere he finds lacunae which only diaschisis is able to fill. Whether diaschisis is the true explanation and will cover the many hiatuses in our knowledge of cerebral localization, or whether some other theory will take its place, it is a pleasure to follow the author through a thousand pages of highly scientific and critically well-digested material. Monakow has again given to the profession a monumental work, the like of which is to be found in no other language; apart from its controversial character, it gives the best summary of cerebral localization with which we are acquainted. The bibliography alone contains 3,174 references.

THE PRACTICE OF PEDIATRICS. By Charles Gilmore Kerley, Professor of Diseases of Children in the New York Polyclinic Medical School and Hospital. Cloth. Price, $6 net. Pp. 878, with 139 illustrations. Philadelphia. W. B. Saunders Company, 1914.

This book is not merely a new edition of Dr. Kerley's "Treatment of Diseases of Children"; it is a comprehensive text-book on diseases of children. Dr. Kerley's students will appreciate his book. In addition to being an excellent text-book, it has that direct personal appeal of the clinical teacher of large experience. The book in not simply a compilation, but every page reflects the personal opinion of the author. This makes it peculiarly positive and practical when coming from a clinician of such large and varied experience. The book can be recommended safely to the student, but even more to the practitioner, as a conservative, sane, up-to-date, practical treatise on pediatrics that easily takes its place among the two or three best American text-books on that subject. The chapter on vaccine therapy is up to date but conservative, and those especially interested in gymnastic therapeutics will find forty pages devoted to that subject.

IMMUNITY: METHODS OF DIAGNOSIS AND THERAPY AND THEIR PRACTICAL APPLICATION. By Dr. Julius Citron, Assistant at the University Clinic of Berlin. Translated from the German and Edited by A. L. Garbat, M.D., Assistant Pathologist, German Hospital. New York. Second Edition. Cloth. Price, $3.50 net. Pp. 267, with 40 illustrations. Philadelphia: P. Blakiston's Son & Co., 1914.

This edition of Citron's well-known manual on immunity will undoubtedly prove even more popular than the first. The subject-matter has been brought thoroughly up-to-date through valuable additions made by the editor. In these days the subject of immunity and immunologic reactions has become so extensive that the general worker may hope for little beyond a slight knowledge of this field. Books like this

present the material in such a clear-cut and concise manner that the more important phases of the work may be grasped in a short time. Moreover, this book gives such attention to detail of technic that one may become qualified to perform the usual tests applied to such investigations. It is not to be supposed, however, that the mere mastering of technic will make a specialist in such work. Citron, as well as many others, emphasizes the fact that careful study of the variations arising in different tests as well as of the methods of proper control of all tests must be made before one is able to attempt the proper interpretation of his tests. Care and precision in each test made as well as an enormous experience along lines of serum diagnosis are necessary for the worker in this field. The subject-matter embraces both theoretical and practical discussions, the latter being limited to methods used in the clinic for diagnostic, therapeutic or prophylactic purposes. Citron's wide experience enables him to point out the various details of the tests so clearly that little excuse is given for improper technic. This book may be commended to the general and even special worker as, probably, the clearest and most practical exposition of this important field of research at our disposal.

Le Laboratoire du Practicien. Analyse Clinique—Méthodes et Procedés. Guide de Diagnostic et D'Hygiene Prophylactique des Maladies Communes Exotiques et Tropicales. Par Paul Gastou, Chef du Laboratoire Central et de Radiologie de L'Hopital Saint-Louis. Third Edition. Paper. Price, 4 francs. Pp. 140, with 319 illustrations. Paris: A. Poinat, 1914.

With the appearance of the third number, Gastou completes his admirable discussion of the value and limitations of the physician's laboratory. As Gastou has previously pointed out, the general worker should not only be in a position to perform a large portion of his own laboratory work but, especially, must also have sufficient knowledge of theory and technic to enable him properly to interpret the findings of others. The proper fittings and equipment as well as the more important methods to be used have been the points taken up in this little manual. This number deals, in a clear and concise manner, with the chemical and microscopic examination of the urine; study of colloids and crystalloids; investigation of normal and pathologic secretions and excretions; examination of feces; methods of histology and pathology, and serodiagnosis, especially as applied to the study of agglutination and complement fixation. It is not to be supposed that the methods have received extensive elaboration, as this is not the purpose of the work. Enough is given, however, to enable one to become familiar with the best methods of study of a given problem. The illustrations are numerous and, for the most part, adequate. This manual is to be commended to those who may wish a brief work covering the more important phases of the rather extensive and important field of clinical diagnosis.

Pain: Its Origin, Conduction, Perception and Diagnostic Significance. By Richard J. Behan, M.D. Cloth. Price, $6. Pp. 920, with 191 illustrations. New York: D. Appleton & Co., 1914.

The first 140 pages of this book treat of pain in the abstract. Here the author discusses the perception, nature, distribution and intensity of pain and its relation to other sensations. He has made an exhaustive study of the literature on the related subjects from which he often quotes: He is somewhat dogmatic at times, but this makes the subject-matter clearer than if he expressed the conflicting views of the literature. The remainder and greater part of the book discusses the pains which are peculiar to special organs, as the appendix; and to special regions, as pains in the back or head. The author pays particular attention to differential diagnosis of pain and has a number of well-arranged tables on diagnosis. The value of the work is considerably enhanced by many excellent illustrations and diagnostic charts. The book should prove valuable to the general practitioner, both as a reference book for the particular case and for a careful study of the whole subject. There is a well-arranged bibliography whereby those who wish to consult the original literature may be able to do so.

Lectures on Dietetics. By Max Einhorn, Professor of Medicine at the New York Post-Graduate Medical School and Hospital. Cloth. Price, $1 net. Pp. 155, with 4 illustrations. New York: Paul B. Hoeber, 1914.

The author has undertaken to produce his lectures from the stenographer's notes without revision. The result is a certain familiarity of style that makes the topic interesting. The book deals in principles rather than in detailed facts, and is marked by strong common sense and conservatism. The principle is laid down that the strong man when acutely sick does not need food, although the nutritive needs of the aged and of poorly nourished persons should be kept in mind. In chronic diseases, on the other hand, the need of nutriment should be met by sufficient food even if other forms of treatment are interfered with and some symptoms are temporarily made worse. Therefore the author feeds the patient in chronic diarrhea even if some nourishment is lost by the increased number of bowel movements. Some tables and descriptions of special diets supply data for application to individual cases. The book tends to remove the arithmetical aspects of dietetics and place it on the high ground of rational therapeutics. We bespeak for it a cordial reception by the profession at large, for its subject appeals to every practitioner rather than to any specialist.

Medical Education and State Boards of Registration

COMING EXAMINATIONS

Alberta: Edmonton, September 15. Registrar, Dr. Cecil E. Race, University of Alberta, Edmonton.

Iowa: Des Moines, September 10-12. Sec., Dr. Guilford H. Sumner, Capitol Bldg., Des Moines.

Massachusetts: Boston, September 8-10. Sec., Dr. Walter P. Bowers, State House, Boston.

Missouri: Kansas City, September 28-30. Sec., Dr. J. A. B. Adcock, State House, Jefferson City.

New York: September 22-25. Chief of Examination Division, Mr. Harlan H. Horner, Department of Education, Albany.

West Virginia April Report

Dr. S. L. Jepson, secretary of the West Virginia State Board of Health, reports the oral and written examination held at Charleston, April 21-23, 1914. The number of subjects examined in was 10; total number of questions asked 100; percentage required to pass was 80. The total number of candidates examined was 16, including one osteopath, of whom 14 passed, including one osteopath, and 2 failed. Fifteen candidates were licensed through reciprocity. The following colleges were represented:

PASSED

College	Year Grad.	Per Cent.
George Washington University	(1913)	87
Howard University	(1912)	85.7
College of Phys. and Surgs., Baltimore	(1913) 89.2, 90, 91.8,	92.3.
Maryland Medical College	(1912) 83.4; (1913)	88.2
Leonard Medical School	(1911)	83
Starling-Ohio Medical College	(1913)	81.2
Woman's Medical College of Pennsylvania	(1907)	86.6
University College of Medicine, Richmond	(1913)	81.4, 86

FAILED

Leonard Medical School	(1911)	78.4
Meharry Medical College	(1912)	75.3

LICENSED THROUGH RECIPROCITY

College	Year Grad.	Reciprocity with
Atlanta College of Phys. and Surgs.	(1912)	Tennessee
Rush Medical College	(1912)	Illinois
University of Louisville	(1911)	Kentucky
College of Phys. and Surgs., Baltimore	(1904)	Maryland
Maryland Medical College	(1912)	Maryland
Medical College of Ohio	(1898)	Ohio
Starling Medical College	(1887)	Ohio
Starling-Ohio Medical College	(1911)	Ohio
University of Wooster, Med. Dept.	(1898)	Ohio
Jefferson Medical College	(1908)	Pennsylvania; (1912) Illinois
Woman's Medical College of Pennsylvania	(1910)	Penna.
Chattanooga Medical College	(1910)	Tennessee
Univer. Coll. of Med., Richmond	(1900)	Virginia; (1904) Virginia

Miscellany

Supervisory Medical Officers in Germany

In Germany provision is made for a supervisory medical service in charge of district physicians known as *Kreisaerzte*. Consul H. W. Harris at Frankfort, in *Daily Consular and Trade Reports*, June 9, 1914, describes the manner of appointment and duties of these medical officials. They are appointed by the state and are under the supervision of the state authorities in the various provinces. They may be called on to cooperate with local health authorities, mine and factory inspectors, federal insurance officers and others. Their duties embrace not only matters for the prevention of disease, but also duties which under American practice belong to coroners, medical examiners, boards of health, mine inspectors, undertakers, etc. In combating infectious diseases the local authorities must render assistance in carrying out the district physician's proposals. He is charged with the duty of maintaining intimate relations with private medical practitioners of his district for promoting knowledge about medical matters, medical societies, etc., and in making investigation in regard to outbreaks of infectious diseases he must consult with the private physicians who have cases under treatment. This applies to meningitis, lockjaw, childbed fever, typhoid, diarrhea, relapsing fever, hydrophobia, glanders, trichinosis, meat- and fish-poisoning, snake-bite, etc., as well as to the usual infectious diseases. He must watch over general health conditions and see to the enforcement of the laws and regulations in regard to health, apothecaries, hospitals, other health institutions, midwives, etc. He is required to keep a record of all physicians, medical assistants, dentists, midwives, apothecaries and druggists with their clerks and apprentices, and must also keep a personal record of the status of every practitioner in his district, and must make it his particular task in conjunction with the medical practitioners of his district to warn in a proper way against the injurious doings of quacks, and must keep a watchful eye on persons who practice the healing art without permission and who assume titles in this connection to which they are not entitled. With the aid of the police he keeps a biographical record of quacks and illegal practitioners. He also inspects drug-stores, dispensaries and similar establishments, inspects the books and sees that illegal fees are not charged for prescriptions. He also keeps especial surveillance over midwives and their practice, and examines and passes on the fitness of persons who wish to practice midwifery. Besides these duties, specific instructions are given to district physicians in regard to housing, factory and hygienic conditions of the people, and on many other subjects. He is the medical authority to whom are to be referred all matters pertaining to the hygienic welfare of the people of his district. He may be employed full time on salary, in which instance he is not allowed to do private practice, or he may be on salary and fees, when he may be allowed to practice. In addition to the very modest salary, certain allowances are made for house-rent, office, caretaking, etc. Leave of absence for rest or on account of sickness is allowable each year, and after ten years of service as district physician, if incapacitated he is granted a pension for life.

Fly Larvae and Horse Manure

The Department of Agriculture has been conducting experiments to find a method of destroying flies by chemical treatment of horse manure (*Bull.* 118, Dept. Agric., July 14, 1914). Of the twenty-four chemicals tested, the best results were obtained from borax and calcined colemanite or crude calcium borate, which showed a larvicidal power of over 99 per cent. in nearly all trials. Borax not only kills the larvae but also prevents the eggs from hatching; calcined colemanite acts on the larvae alone. The minimum effective amount is 0.62 pound of borax and 0.75 pound of calcined colemanite with the addition of 2 or 3 gallons of water to 8 bushels (10 cubic feet) of manure, which will destroy practically all the fly maggots. In these small quantities the borax did not interfere with the normal fermentation of the manure. Since boron in large quantities inhibits the growth of plants, tests were also made to determine if the borax-treated manure exerted any such deleterious effect. Tests on tomatoes, peas, beets, radishes, kohlrabi, oats, corn, cucumbers, lettuce, apple seedlings and rosebushes were negative with the amounts of borax mentioned. Wheat appeared to suffer a temporary setback under heavy applications of borax. The department issues the warning that borax-treated manure has not been studied in connection with the growth of all crops, nor has its cumulative effect been studied. It recommends that not more than 15 tons per acre of borax-treated manure should be used, and that not over 0.62 pound of borax be employed for each 8 bushels of manure. The suggestion is made that borax be applied to floors and crevices in barns, stables, markets, etc., and to street sweepings, and water added as in the treatment of horse manure. Borax, which costs about 10 cents a pound at retail, may be had at 5 or 6 cents a pound in 100-pound lots; calcined colemanite sells for about 2 cents a pound in large shipments, and for about 4 cents a pound in smaller quantities. The department figures that the cost of borax treatment will be about 1 cent per horse per day, and that of treatment with calcined colemanite considerably less

Training the Left Hand

Some time ago the development of left-handedness in children was warmly advocated by various persons not only because in this way reliance could be placed on both upper extremities for mechanical work, which would undoubtedly be of advantage in case of serious disturbance of the functions of the right arm, but also because the hope was entertained that by training the left arm, a second speech center might develop in the right hemisphere of the brain in the same way as the well-developed right arm corresponds with the speech center placed in the left half of the brain. The Berlin physician, M. Fränkel, was especially active in the advocacy of this plan; in fact, experiments in this direction were undertaken in various localities. The practical results which have been so far reported do not correspond in any degree to the optimistic expectations of the advocates of the method.

In 1911, Dr. Schäfer, on the basis of permission granted by the school deputation, collected statistics with reference to left-handedness among about 18,000 pupils of the Berlin public schools. These statistics show that 4.06 per cent. of all the children are left-handed, 5.15 per cent. of all the boys and 2.98 per cent of the girls. The percentage of children in whom both hands are equally developed is very small, being only 0.21 per cent. The overwhelming majority, 95.73 per cent. of all children, are distinctly right-handed. In several school districts, among 448 teachers there were ten who were left-handed. L. Katscher's work on "Training the Left Hand" (*Die Ausbildung der linken Hand*) was the theoretical basis for the exercises to train the left hand. They included exercises in writing, arithmetic, manual training and gymnastics; especially in the last two systematic efforts were made. In general, the result showed that the possibility of employing the hitherto unused left hand at first excited great joy and marked interest, but the physical awkwardness generally was a great hindrance. This was particularly shown in writing, in which the mirror-writing and scrawling crows' tracks diminished the success of the instruction. In drawing, the success was relatively greater, especially when the drawings were made on the blackboard; also in manual training good results were obtained in building, plaiting and weaving. In gymnastics the special exercises such as bending the fingers, the hand and the left arm produced an increasing aptitude and skill.

The experiment was tried in 145 classes. Children to the number of 2,611 (1,497 boys and 1,114 girls) undertook these left-handed exercises. They were given up in three cases; in one class because the teacher was ill, in two others because these exercises were regarded as useless, time-consuming in

carrying out the instructions laid down by the school board, and a hindrance.

The outcome of the whole experiment shows that in no case could a preference for the left hand be developed. It may be trained to be a welcome assistant to the right hand, but never as a substitute for it. In teaching writing the complaint is made of a destruction of the esthetic sense and a deterioration of the hand writing. The children refused to write with the left hand, became nervous and worried over it, and increased intellectual development was in no case observed. Almost all those who gave an opinion were unanimous that the advantages stood in no relation to the expenditure of time, pains and patience.

Old Age Pensions in Denmark

For twenty years Denmark has had laws providing for old age pensions. Prof. Katherine Coman gives in the *Survey* the history of this legislation and its working, together with a statement of opinion as to the law, derived from an inquiry in that country concerning it. The pension is granted to persons over 60 years of age, either men or women, who are found to be worthy and in need. An unmarried woman is subject to the same conditions as a man. Wives, widows or divorced women are entitled to a pension equivalent to that which would have been awarded to the husbands. The amount of the pension is not fixed by law, but is left to be determined in each case. An attempt has been made in some communities to standardize the amount of the pension. This applies practically only to Copenhagen and Fredericksborg. A maximum pension was fixed, which differs for men and women, married couples and couples with children in the places mentioned above. A maximum is also fixed for other towns and the rural districts. The tendency has been for the amount granted to be increased from year to year, although the amounts are still very low, estimated on the basis of the cost of living in a country like the United States. These pensions seem to be becoming a heavy burden on the taxpayers of the communes and on the state treasury, which has assumed half of the expenditure.

In 1895 the average annual pension in Denmark cities, was 72.59 kroner (a krone is about 27 cents). In 1906 and 1907, the average had increased to 118.69 kroner. In 1892, the total number of beneficiaries under this pension law was 43,826. In 1911 it had increased to 79,289. The total expenditure had increased from 2,500,000 kroner in 1892 to 13,000,000 in 1912 and 1913. In an investigation of this form of provision for old age, it was found that the sums expended for poor relief outside the pension law have also increased. An inquiry by Professor Coman as to whether this amount was not regarded as a new form of poor relief, was answered by every one from taxpayer to administrator in the negative, though there were differences of opinion as to the desirability of such a law. Professor Coman states that there is no question that the economic injustice of leaving the workingmen in a condition in which they are liable to suffer from actual want or requiring them to accept poor relief has been satisfactorily terminated, and heavy burdens have been lifted from children, relatives and benevolent employers. The rapid increase on the demands on the public treasury, however, have startled even the best friends of the measure, and already modifications of the law have been suggested whereby workingmen are to be required to contribute, during their working years, to the fund for their later relief. Another plan suggested has been to standardize the pensions for towns and rural districts, as in the case of the city of Copenhagen, in order that the amount of expenditure required may be made more certain than under the present arrangement. It has been proposed to reduce the number of beneficiaries by raising the age limit to 65. It may not be easy to retract a concession like this, since every laborer has a vote, and practically all belong to the Social Democratic Party, whose opinion is generally that the workingman is entitled to an amount of the surplus which the employer makes.

Medicolegal

Malpractice in Treatment of Gunshot Wound

(Dailey vs. Shafer (Mich.), 146 N. W. R. 192)

The Supreme Court of Michigan affirms a judgment against the defendant for malpractice while treating the plaintiff's husband for a gunshot wound in the calf of his right leg. The court says that the shot tore its way clear through the thick part of the calf, leaving a hole large enough to insert two fingers. The man was removed to his house, and the defendant arrived within a few minutes thereafter and took charge of the case. The wound was partially cleansed and some of the foreign matter removed, after which antiseptic gauze was inserted, and the leg was bandaged. Strychnin tablets were administered, as the patient was suffering from shock and loss of blood. After giving members of the family some instructions as to treatment during his absence, he left at about 11 a. m., after having been there an hour, and returned at 3 p. m., to find the patient somewhat improved. At this time, he remained about fifteen minutes. On the first visit, the defendant made some investigation to learn the extent of the injury, but did not go far enough with it to learn whether any of the arteries had been severed or punctured. On the second visit, he made no investigation in this respect. At 7 p. m. it was thought that the patient was bleeding too freely, and repeated attempts were made to reach the defendant over the phone, but without avail. At 4 a. m. next day, the condition became alarming, and a neighbor was dispatched for the defendant, but before he arrived the patient was dead. A post-mortem examination disclosed the facts that the posterior tibial artery was cut off and the popliteal artery was partially divided, and experts gave it as their opinion that the patient died from arterial hemorrhage. The negligence with which the defendant was charged was: First, a failure to ligate the severed and injured arteries; second, in failing to visit and attend to the patient as often and as much as he should have done. The defendant admitted that he did not inform himself as to whether the arteries were cut off or punctured, and it was shown by expert witnesses that he should have done so; that he should have found the bleeding point and stopped the hemorrhage. After he determined what course to pursue without this information, he was in no position, as a matter of law, to invoke the protection of the rule in emergency cases, but it was properly submitted to the jury to determine whether he did what was necessary to bring his treatment within the rule in emergency cases, that if a physician exercises his best judgment as to the treatment, he is not liable for negligence for an error of judgment in following one treatment rather than another. The other ground of complaint, as to whether the defendant gave the patient the attention and care which the case demanded, was likewise one for the jury.

Practice of Medicine by Chiropractor

(People vs. Ellis (N. Y.), 147 N. Y. Supp. 681)

The Supreme Court of New York, Appellate Division, Second Department, affirms a conviction of the defendant of the misdemeanor of practicing medicine within that state without any license or registration. The court says that the defendant claimed to be a chiropractor or doctor of chiropractic. He had a sign with regular office hours, and as a witness he admitted having treated about 200 persons for ailments of the stomach, chest, or spine, also for nervousness, hysteria, and diseases coming from pressure on the nerves. The prosecution proved by a witness whom the defendant had treated that the defendant first examined her ankle, pronounced the arch as having fallen, massaged the foot, and advised a different shoe. On a further visit he manipulated the patient's spine, which, speaking as a spinologist, he pronounced out of alignment in several places. He said he could restore it, but it probably would not stay the first time. He further gave the opinion that the nerves lead-

ing to the ankle might be so impinged on as to cut off the circulation. In view of the large increase of those who attempt remedies without drugs or instruments, legislatures in this and other states have found it necessary to deal with all who assume to treat or prescribe for physical ailments. The defendant's office-sign, circular and professional card, as well as his own frank admissions as a witness, all showed that he held himself out as able to diagnose, treat, and prescribe for pain, disease and injury. Rubbing and pressure on the human joints are old therapeutic agents. When accompanied by such attempts at diagnosis as the statement that a patient's pains in the ankle were caused by the spine, having come out of alignment through displaced vertebrae, the defendant's acts came within the statutory definition of the practice of medicine. He therefore was guilty of the misdemeanor of practicing medicine without a license, or being registered under the public-health law, Section 174. The information which charged practicing medicine without lawful authority between certain dates, and in particular on five days which it specified, was sufficient. The different acts going on to establish the unlawful practice need not be more particularly set forth in the information, as they simply made up one continuous offense.

Attending Physician Versus Experts on Mental Condition

(Philpott et al. vs. Jones et al. (Ia.), 146 N. W. R. 859)

The Supreme Court of Iowa holds that in this case, in which the probating of a will was being contested on the ground that the maker lacked testamentary capacity, an instruction was properly refused which would have told the jury that "the attending physician is presumed to know the state of the mind of his patient, and these are facts that should be considered by the jury in determining the weight that should be given to their testimony." There is no presumption that a physician who is called to treat a sick man for his physical ailments, is better qualified to testify as to the mental condition of the patient, from the mere fact of attendance on his physical sickness, than is one who is trained to the treatment and who has large experience in the treatment of mental diseases. Besides, the weight to be given to the testimony of a witness depends on too many things to justify the court in limiting its probative force to one particular fact. The condition of the human mind at any stage of human existence is difficult of proof; perhaps the most difficult of any with which courts and juries are compelled to deal. Mental unsoundness, whether resulting from old age or physical sickness, is so various in its character and so different in its manifestations that it is often difficult for the most experienced experts, after most careful and thorough investigation, to trace it to any sufficient cause or to define its extent or its effect on the conduct of the individual. Even the most experienced alienists, with all the facts before them touching the conduct of the individual concerning whose mental condition the investigation is instituted, are often found widely differing in their conclusions as to the then condition of the mind under consideration. Mental unsoundness may exist which would render a man incompetent to make a will, notwithstanding to all outward appearances he seems to be sane to those with whom he comes in casual contact, who are not experts on the question.

Entitled to Recover Expenses and Compensation

(Plumb vs. York County (Neb.), 146 N. W. R. 938)

The Supreme Court of Nebraska holds that a regularly licensed physician, who is paid a salary of $5 per month for his professional services in treating the inmates of the county poor-farm and the county jail, may recover from the county the actual expenses incurred by him in quarantining, fumigating, and suppressing an epidemic of small-pox within his county, together with a reasonable compensation for his services. The court says that it appeared that the plaintiff was called on by the county to attend, quarantine, and fumigate in 132 cases of small-pox. His actual expense in connection with this service was $260, and he charged the county $726 for his professional services in that behalf. The county board disallowed his claim, and he prosecuted an appeal to the District Court. The cause was tried without a jury and the Court awarded him a judgment for $790.35. The county sought to defeat his claim by contending that he was a member of the board of health, and therefore he could not have a return of the money expended by him in the suppression of the disease, and neither could he have compensation for his services rendered in that behalf. Moreover, it appeared that there was no contract entered into between the county and the plaintiff for the services in question, and there was a rule that required members of the board of health to serve without compensation. If the contention of the county was to prevail, however, then the public would be helpless to protect itself against contagious and epidemic diseases. It is easy to understand why the members of the board of health should receive no compensation for serving thereon, but it would be difficult to understand why a physician should be called on to serve the county in suppressing an epidemic and contagious disease without compensation. Many cases were cited to support the contention that an officer must perform all the duties of the office for the compensation provided by law, but those cases were not decisive of this controversy. The plaintiff was entitled to recover the expenses actually incurred and paid by him in the suppression of the small-pox epidemic in question, together with a reasonable compensation for his professional services. The judgment of the District Court was right, and it is therefore affirmed.

On Prohibiting the Use of Tobacco

(City of Zion vs. Behrens (Ill.), 104 N. E. R. 836)

The Supreme Court of Illinois holds void, as an unreasonable interference with the private rights of the citizen, a city ordinance making it unlawful for any person to smoke tobacco in any form, or to have in his possession, any lighted pipe, cigar or cigarette, in or on any street, alley, avenue, boulevard, park, parkway, public passageway, depot, depot platform, depot grounds, hospice, hotel, store, post-office, or other public building or public place within the city. The court says that, recognizing that tobacco smoke is offensive to many persons, and in exceptional cases harmful to some, the court has no doubt that power exists to prohibit smoking in certain public places, such as street-cars, theaters and like places where large numbers of persons are crowded together in a small space. But this is quite a different matter from prohibiting smoking on the open streets and in the parks of a city, where the conditions would counteract any harmful results. The personal liberty of the citizen cannot be interfered with unless the restraint is reasonably necessary to promote the public welfare. In the broad language in which this ordinance was enacted it was apparently an attempt on the part of the municipality to regulate and control the habits and practices of the citizen without any reasonable basis for so doing.

Entitled to Show Who Employed Physician

(Egner vs. Curtis, Towle & Paine Co. (Neb.), 146 N. W. R. 1032)

The Supreme Court of Nebraska says that it appeared that, after the plaintiff was injured, a physician, unknown to, and without authority from him, was called to treat his injuries, and, without any subsequent employment by him, continued to treat him for a considerable period of time. On the trial of the action which he brought against his employer to recover for his injuries, his counsel called the physician to the witness stand and attempted to show by him who employed him. That was not misconduct on the part of counsel. If, as a matter of fact, the physician was the physician of an insurance company that had contracted to indemnify the employer for injuries to its employees, and, by reason of that fact, was called to treat the plaintiff after his injury, the plaintiff had a right to show the fact as a circumstance tending to show that the defendant recognized a liability. If some insurance company was defending the case under the cover of the defendant's name, it was proper to uncover it.

Society Proceedings

COMING MEETINGS

Amer. Assn. of Obstetricians and Gynecologists, Buffalo, Sept. 15-17.
American Association of Railway Surgeons, Chicago, Oct. 14-16.
American Electro-Therapeutic Association, Battle Creek, Sept. 15-17.
American Roentgen Ray Society, Cleveland, Sept. 9-12.
Association of Military Surgeons of the U. S., Cincinnati, Sept. 29-Oct. 2.
Colorado State Medical Society, Boulder, Sept. 8-10.
Delaware State Medical Society, Wilmington, Oct. 13-14.
Idaho State Medical Association, Boise, Oct. 8-9.
Indiana State Medical Association, Lafayette, Sept. 24-25.
Kentucky State Medical Association, Newport, Sept. 23-25.
Med. Soc. of the Mo. Valley, Des Moines and Colfax, Ia., Sept. 17-19.
Michigan State Medical Society, Lansing, Sept. 11-12.
Minnesota State Medical Association, St. Paul, Sept. 30, Oct. 1-2.
Nevada State Medical Association, Reno, Oct. 13-15.
New Mexico Medical Society, Albuquerque, Oct. 5-7.
Oregon State Medical Association, Portland, Sept. 10-11.
Pennsylvania State Medical Society, Pittsburgh, Sept. 21-24.
Utah State Medical Association, Salt Lake City, Sept. 29-30.
Vermont State Medical Society, Rutland, Oct. 8-9.
Washington State Medical Association, North Yakima, Sept. 21-23.
Wisconsin State Medical Society, Oshkosh, Oct. 7-9.

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Public Health, Boston

July, IV, No. 7, pp. 555-632

1 Conservation of Vision. F. Allport, Chicago.
2 Collection of Municipal Waste. W. F. Morse, New York.
3 Advantages and Disadvantages of Day and Night Collection of Municipal Waste. W. H. Edwards, New York.
4 Recoverable Values of Municipal Waste. G. H. Norton, Buffalo.
5 Cost of Incineration. P. M. Hall, Minneapolis.

Annals of Surgery, Philadelphia

July, LX, No. 1, pp. 1-136

6 *Experimental Operations on Orifices of Heart. A. Carrel, New York.
7 *Bronchiectasis. W. Meyer, New York.
8 *Surgical Aspects of Bronchiectasis. J. G. Mumford and S. Robinson, Clifton Springs, N. Y.
9 Choice of Anesthetic in Operating for Abscess of Lung. F. T. Murphy, St. Louis.
10 *Results of Conservative Treatment of Cystic Disease of Breast. R. B. Greenough and C. C. Simmons, Boston.
11 Two-Stage Operation Especially in Its Relation to Treatment of Cancer. G. W. Crile, Cleveland.
12 *Arteriovenous Anastomosis of Femoral Vessels for Impending Gangrene. Report of Sixteen Cases. C. Goodman, New York.
13 *Melanoblastomas of Foot (Chromatophoroma, Melanoma, Melanosarcoma). Report of Ten Cases. A. E. Hertzler and E. T. Gibson, Kansas City, Mo.

6. **Experimental Operations on Orifices of Heart.**—Also published in *The Journal of Experimental Medicine*, July, 1914, and abstracted in THE JOURNAL, August 1, p. 428.

7. **Bronchiectasis.**—It is generally recognized, says Meyer, that a somewhat advanced, viz., a well developed, bronchiectasis is a surgical and not a medical disease. The operative treatment should be considered from the following points of view: *A*. Pneumotomy for draining the suppurating cavities. *B*. Operations done to compress the lung (collapse therapy). (1) By creating therapeutic pneumothorax—nitrogen insufflation; (2) pneumolysis with or without introduction of a tissue filling; (3) thoracoplasty, combines with, or without (4) phrenicotomy. *C*. Operations done to influence the pulmonary parenchyma, producing contracting plus carnification. (1) Transposition of the lung; (2) ligation of branches of the pulmonary artery, with or without subsequent thoracoplasty, pneumolysis and phrenicotomy—intrapericardial ligation of the first divisions of the pulmonary artery. *D*. Amputation of the diseased lung.

8. **Surgical Aspects of Bronchiectasis.**—The following points are emphasized by Mumford and Robinson. Granted that bronchiectasis is commonly the result of bronchial obstruction by foreign body, tumor or disease, the first indication in therapy should be the removal, if possible, of this obstruction. Bronchoscopy for the removal of a foreign body has not infrequently arrested bronchiectasis. In the earlier stages of bronchiectasis, nitrogen gas injection producing artificial pneumothorax is indicated, and should always be tried.

Pleuropneumolysis, or extensive rib resection, is a dangerous procedure, with additional dangers in bronchiectasis. It should be employed only when adherent pleura prevents the introduction of nitrogen gas. Even then it is a dangerous procedure, and one of doubtful value. In late cases of bronchiectasis, when the disease is obviously confined to one lobe, lung resection is the sole hope of surgical cure. The attempt at lung resection at a one-stage operation has been attended with high mortality. Occasional successes do not prove that the one-stage amputation will become the method of choice. The authors hold that for the time being, at least, the general surgeon should first produce compression of the lung by artificial pneumothorax or pulmonary arterial ligature; second, and much later, he should excise. Meanwhile the student of thoracic surgery will develop the one-stage excision.

10. **Conservative Treatment of Cystic Disease of Breast.**—Eighty-three cases in which cystic disease was present have been investigated by Greenough and Simmons and proved by pathologic examination of the tissue removed at operation, but all were cases in which only a partial removal of the diseased gland tissue was performed. The subsequent incidence of carcinoma in these cases, therefore, gives a further light on the tendency toward its development in cystic disease of the breast. In 14 both breasts were operated on—a total of 97 operations. In 59 cases partial plastic resection was performed, and in 32 a local excision was made of the affected portion of the breast. In 2 cases all of the gland tissue was subsequently removed by the plastic operation (subcutaneous amputation), and in 4 cases a later total amputation was done.

The subsequent histories of the 83 cases have been investigated. The length of time which elapsed from the first operation varies in these cases from one to seventeen years, an average of over seven years for each case. Four of the 83 patients, or 4.8 per cent., developed carcinoma of the breast—3 after partial plastic resection, and 1 after a simple excision of the tumor. Four patients have died of other causes, without evidence of any disease of the breast. Sixty-two patients are alive and well, and these with the four dead without recurrence, make 66 of the 83 cases, or 80 per cent., free from recurrence and apparently up to the present time, at least, cured of their disease by a partial operation.

Thirteen cases (15.6 per cent.) showed sooner or later a return of the disease. In 5 patients the disease returned in the other breast, and in 8 patients it recurred on the same side, in the gland tissue remaining after the first partial operation. One patient died ten years after operation with a broken hip. Another five years after operation with a cerebellar endothelioma. In neither case was there evidence of any malignant process in the breast, though both were reported to have had recurrence of cysts. Four patients refused operation, and were reported living and well but with cystic disease present—1 one year, and 3 five years after operation. The other 7 were operated on again, by amputation of both breasts in the greater number of cases, and reported well at intervals of ten, five, four, two, one and one-half years, seven months and one month later. Thus either recurrence of the cystic disease or carcinoma occurred in the breast first subjected to a partial operation in 12 cases out of the 83, or 14 per cent. In 16 cases, or 19 per cent., the patient failed to get permanent relief by the partial operation. In this connection it is of interest to note that in 19 of the 83 cases, or 23 per cent., the disease affected both breasts, although in a different degree. Of the 19, 14 had operative treatment on both breasts, and 5 had operation on one side alone.

The authors emphasize that the occurrence of carcinoma in cases of cystic disease, estimated at about 10 per cent. of all cases, demands radical treatment in all but the mildest cases. The operation of choice should remove all of the

V. 191

gland tissue of the affected side, and, when the disease is bilateral, of both sides, this can best be accomplished by "subcutaneous amputation," leaving the nipple and areola, or by elliptical amputation. Where grave doubt as to diagnosis is present elliptical amputation is to be preferred. Local excision of nodules in the breast, suspected of being malignant, should never be performed. The operation of local excision or partial plastic resection should be restricted to the earliest and mildest types of cystic disease. In such cases plastic resection is the operation to be preferred.

12. **Arteriovenous Anastomosis.**—A view of Goodman's series of 16 cases shows six successes. Several of the cases which promised success, later required amputation (eight cases), but even these patients received temporary relief from pain. The results seem to warrant the conclusion that the procedure is well worth trying in suitable cases, as it affords the only hope, except amputation, for the patient threatened with gangrene. There were 13 end-to-end anastomoses, 1 side-to-side, and in 2 of the cases, an exposure of the vessels showed that an attempt to anastomose was not warranted, on account of the advanced stage of thrombosis of the vessels. In 2 of the cases with gangrene, a low amputation seemed to be satisfactory. Of the 8 cases which were failures, including 1 death, 1 was side-to-side anastomosis, and 3 of the remainder should not have been operated on on account of the presence of spreading gangrene.

13. **Melanoblastomas of Foot.**—The disease is one of advanced age. Males preponderate. In a few of the authors' cases there had been a lesion previous to the tumor, in 1 as long as eight years. These tumors spread by way of the lymphatics. The great viscera which are the usual site of blood-vessel metastasis are singularly free in this affection. The disposition to local recurrence is striking. The variability of the physical appearance is in striking contrast to the clinical similarity. In form they vary from small excoriated ulcers not unlike any indolent ulceration to large angry-looking, fungoid, pigmented masses. The variability in form is, however, not essential. They are all tumors which arise in the dermic or subdermic tissue and push through their covering, the difference in form depending on whether or not they just destroy the skin or project above it. The characteristic portion lies beneath the skin, not above it.

These tumors, the authors state, must be reckoned among the most fatal but in some of the early cases cure may be possible. Very early diagnosis is absolutely essential. Unfortunately when they reach the surgeon they have usually already been subjected to local irritation which has but stimulated their growth. Theoretically, at least, local treatment would cure them if done early. Yet there is never any assurance that the tumor is strictly localized. The tumor should therefore be excised in all cases. In early cases local excision should, theoretically suffice, but there is nothing in the literature to justify such a procedure. On the other hand, if dissemination has already taken place, amputation will avail nothing. The patient may as well in that event use his foot during the small span of life still remaining to him. The fungoid type should give a better prognosis than the ulcerous and should give more encouragement to radical operation. When glands along the iliac vessels are involved any operation is useless.

Boston Medical and Surgical Journal

August 13, CLXXI, No. 7, pp. 253-288

14 *Effects Observed in the Use of Mixed Toxins (Coley) in Sarcoma. T. W. Harmer, Boston.

15 Roentgen Diagnosis of Incomplete Forms of Pyloric Stenosis. F. H. Baetjer and J. Friedenwald, Baltimore.

14. **Mixed Toxins in Sarcoma.**—This paper is based on observations made since June, 1909, in the use of mixed toxins of streptococcus and bacillus prodigiosus (Coley) in 91 cases. Some were early cases in the series in which the doses were too small. Some cannot be traced, some were cases in which no pathologic report was obtained. Some were cases of microscopically proved carcinoma. Some were cases of proved sarcoma in which the toxins were administered as a prophylactic against recurrence after operations which might of themselves have cured. There remain 32 cases; all of these were primary or recurrent, inoperable sarcomata, or cases in which the disease could not be eradicated at operation. All were proven by microscopic examination. All were under treatment at least three weeks. In all cases the results were free from vitiation by concurrent treatment. The average age of all cases is 33.8 years. The average duration of treatment was three months +. The average maximum dose was 11.9 minims. The maximum dose was 53 minims.

The cases are arranged in six groups, determined by the effect of the toxins. Group A includes those cases in which there was no appreciable effect (10 cases). Group B includes those cases in which the growths softened but did not diminish in size. There were 5 such cases. Group C includes those cases in which the growths disappeared, or practically disappeared, but returned. There were 5 such cases. Group D includes those cases in which growths disappeared but metastases simultaneously occurred. There were 5 such cases. Group E consists of one case in which the growth diminished in size but the tumor still persists. Group F consists of those cases which are apparent cures in which growths have disappeared and no metastases have occurred. There are six such cases. They have remained apparently well since conclusion of the treatment, respectively, one year, two months; two years; two years, seven months; two years, nine months; two years, eleven months, and two years, eleven months.

Harmer emphasizes that the treatment of primary or recurrent inoperable sarcoma with mixed toxins must be intensive. The increment of dose and the interval between injections requires some experience but, even after a considerable experience, this method of treatment is always uncertain and so distressing that, its institution is unjustifiable in any case in which operative measures of reasonable safety offer possible hope of removal. It should be instituted in no case unless proven microscopically to be sarcoma. Its institution is unjustifiable in all cases of inoperable sarcoma. The percentage of apparent cures may be regarded as varying from 9.4 to 18.8. Harmer's study suggests to him that the toxins offer no expectation of benefit in cases with multiple melanotic growths in cases with mixed cell growths, in cases with intra-abdominal growths and in cases arising from subcutaneous tissue or bone, excepting perhaps giant cell growths. It suggests that they may be legitimately tried in cases with single melanotic growths. It suggests that they are apparently of value in cases with sarcomata arising in nose and accessory sinuses, whether spindle cell, giant cell or round cell. The operative treatment of true giant-cell tumors gives, in the majority of cases, such good results that the toxins are not indicated. Their use is, however, warranted in those cases in which the growths are so situated that complete surgical eradication is impossible (such as giant cell tumor of the spine) and in these cases the attack should be primarily surgical, followed by toxin treatment.

Journal of Abnormal Psychology, Boston

June-September, IX, Nos. 2-3, pp. 73-216

16 Contrast in Psycho-Analysis: Three Cases. T. A. Williams, Edinburgh.

17 Analysis and Interpretation of Dreams Based on Various Motives and on Theory of Psycho-Analysis. M. Solomon, Chicago.

18 Hysteric Mechanisms in Children. I. H. Coriat, Boston.

19 Psycho-Analysis. P. Janet, Paris.

Journal of Cutaneous Diseases, New York

August, XXXII, No. 8, pp. 545-606

20 Syphilitic Heredity and Congenital Syphilis. W. P. Boardman, Boston.

21 Noguchi's Luetin Test for Syphilis. W. A. Pusey and A. W. Stillians, Chicago.

22 Dermatitis Exfoliativa. Report of Case. J. W. Miller, Cincinnati.

23 Case of Bromid Eruption. H. G. Irvine, Minneapolis.

Journal of Infectious Diseases, Chicago

July, XV, No. 1, pp. 1-243

24 An Attempt to Transmit Poliomyelitis by Bite of Lyperosia Irritans. E. Francis, Savannah, Ga.

25 *Complement-Fixation in Gonococcus Infections. J. A. Kolmer and G. P. Brown, Philadelphia.

26 *Simple Method of Cultivating Bacilli Preferring Conditions of Partial Anaerobiosis. G. D. Horton, Corvallis, Ore.
27 An Attenuated Culture of Trypanosoma Brucei. C. A. Behrens, Ann Arbor, Mich.
28 *Classification of Pathogenic Streptococci by Fermentation Reactions. J. G. Hopkins and A. Lang, New York.
29 *Anaerobic Cultures in Scarlet Fever. G. F. Dick and G. R. Henry, Chicago.
30 Characteristics of Bacteria of Colon Type Found in Bovine Feces. L. A. Rogers, W. M. Clark and A. C. Evans, Washington, D. C.
31 *Toxins of Intestinal Obstruction. F. B. Gurd, Montreal.
32 Relationship of Septic Sore Throat to Infected Milk. J. A. Capps and D. J. Davis, Chicago.
33 *Experimental Bovine Mastitis Produced with Hemolytic Streptococci of Human Origin. D. J. Davis and J. A. Capps, Chicago.
34 Investigation into Fermentative Activities of Aciduric Bacteria. A. H. Rabe, New York.
35 *Purpura Associated with Bacillus Mucosus in Blood. G. C. Weil and J. W. McMeans, Pittsburgh.
36 Sanitation of Swimming Pools. W. A. Manheimer, New York.
37 Classification of Colon Group. I. J. Kligler, New York.
38 *Quinin Treatment of Rabies. J. G. Cumming, Ann Arbor, Mich.
39 Method for Making Carbohydrate Serum Broth of Constant Composition for Use in Study of Streptococci. W. L. Holman, Pittsburgh.
40 *Action of Vaccines and Concentrated Antistreptococcus Serum in Experimental Streptococcal Arthritis. J. J. Moore, Chicago.
41 Use of Decolorized Acid Fuchsin as an Acid Indicator in Carbohydrate Fermentation Tests. Acid Production by Bacteria. W. L. Holman, Pittsburgh.
42 Experiments on Variability of Fermentative Reaction of Bacteria, Especially Streptococci. W. C. Thro, New York.

25. **Complement-Fixation in Gonococcus Infections.**—About 60 per cent. of all cases of gonococcus infections investigated by Kolmer and Brown reacted positively to the gonococcus complement-fixation test. In the few cases of pyosalpingitis examined, 66 per cent. reacted positively. The highest percentage of positive reactions, 83 per cent., occurred in cases of arthritis, considered clinically as possible gonococcus infections. The authors regard the gonococcus complement-fixation test as of particular value in aiding the diagnosis of the nature of an obscure arthritis, in pelvic inflammatory diseases of women, to deciding whether or not a given case of urethral infection is cured or still harbors foci of living gonococci and aiding in the diagnosis and management of vaginitis in female children.

The reactions are not generally as satisfactory as those occurring in the syphilis reaction because the quantity of gonococcus antibody is much smaller unless grave and widespread gonococcus metastases exist, and the fixation of complement by bacterial amboceptor and antigen is not so marked as that occurring with syphilis reagin and a lipoidal extract. In a comparative study of a number of serums tested with both the antisheep and antihuman hemolytic systems slightly better results were secured with the latter. Gonococcus antigens to be of any value must be polyvalent. An antigen composed of a simple suspension of organisms in saline solution yielded 11 per cent. better reactions than filtrates. It appears that the bacterial protein, aside from the endotoxins, aids in the antigenic effect. Alcoholic extracts of gonococci possess little or no value. The occurrence of positive reactions in about 9 per cent. of cases of chronic gonococcus infections with antigens of staphylococci, streptococci and diphtheroid bacilli, indicates the active rôle these organisms may assume in these infections. The occurrence of about 5 per cent. positive reactions with an antigen of the micrococcus catarrhalis would indicate that this organism may be likewise active in chronic urethritis.

A study of antigonococcus and antimeningococcus sera with antigens of gonococci and meningococci, indicates the close biologic relationship of the gonococcus and meningococcus and while their respective amboceptors are most specific for their own antigens, in lower dilutions this specificity is not so apparent and the results constitute another example of "group" reaction similar to those occurring with the group of streptococci, diphtheria bacilli, spirochetes, etc.

26. **Cultivation of Bacilli Partially Anaerobic.**—Horton describes his method as follows: Employ an ordinary large test-tube such as is generally used in making potato cultures. In this insert a tightly fitting piece of thin glass which should be about three-fourths the length of the test-tube. Place plain agar-agar, as culture medium in the tube and insert a cotton plug. Sterilize the tube thus prepared. After this process slant the tube so that the agar lies high on one side of the central glass slide. Carefully observe the tube and note this, as exactness in this regard has a direct bearing on the success of the technic. The water of condensation will tend to collect at the bottom of the lower side thus minimizing the chance of surface spreading or contamination of the higher side. Streak the lower side with the bacillus subtilis, taking care to cover the whole surface. Inoculate the higher side with some aborted material, amniotic fluid from an aborted calf, or the fluid from the interior of a cyst of the ovary. After inserting the cotton plug, push it down into the tube and place a tightly fitting rubber cork over it to make the tube air-tight. The tube thus prepared must be incubated at 37 C.

Within two to three days growth will take place on the higher side in which the suspected material was planted, thus enabling a further study of the organisms or colonies present. Horton has had excellent results in using this method for the cultivation of the *Bacillus bifidus, Tissier*, and the *Bacillus abortus*, Bang. To aid in this practice it is suggested that test-tubes with the glass slide be made all in one piece, thus precluding all possibility of the *Bacillus subtilis* contaminating the desired growths. So constructed, the tubes may be slanted in the usual way, there being no need for having one side of the slant higher than the other.

28. **Classification of Streptococci by Fermentation.**—Analysis of their experiments seems to justify Hopkins and Lang in drawing the following conclusions: The streptococci usually concerned in severe infections in man may be differentiated from the common saprophytic types by fermentation tests. The tests are best performed in infusion broth colored with litmus, containing 2 per cent. or more peptone and 1 per cent. of the fermentable substance. The initial reaction should be between 0.0 and 0.5 per cent. normal acidity (phenolphthalein). Only a complete change of the litmus to pink should be considered positive. The useful test substances are lactose, salicin, raffinose, mannite and inulin.

On the basis of these reactions Hopkins and Lang can recognize the pathogenic and six saprophytic groups: (*a*) Pyogenic group; characterized by fermentation of lactose and salicin. (*b*) Four salivary groups; two characterized by fermentation of raffinose, one by fermentation of inulin, and one by failure to ferment salicin, raffinose, mannite or inulin. (*c*) Fecal group; characterized by fermentation of mannite. (*d*) Equine group; characterized by failure to ferment lactose. The streptococci in this class are saprophytes and are commonly found in horse dung. Titrations of the amount of acid formed in fermentation are of no value in classification. Tests for ability to hemolyze human blood are of value in that highly pathogenic strains are usually strongly hemolytic. The type of chain formation, the milk coagulation test, and the neutral red reaction, are not reliable as bases for classification.

29. **Anaerobic Cultures in Scarlet Fever.**—In blood-cultures from 24 cases made anaerobically by Dick and Henry positive results were obtained in 20 cases. A comparison of the kind of organisms found in these blood-cultures with the organisms present in the throat and urine would indicate that during the acute stage of scarlatinal angina, organisms enter the blood-stream in considerable number and are excreted in part at least in a viable condition through the kidneys. The authors suggest that the excretion of living bacteria through the kidney may have some connection with the development of scarlatinal nephritis. A number of organisms are described which are commonly associated with scarlet fever, some of which produce rash in guinea-pigs, but the authors were unable to say that any of these animals really had scarlet fever.

Hemolytic streptococci were found in the blood in 7 cases, in the lymph-nodes in 2 cases, in the spleen in 2 cases and in the urine in 3 cases. Very small streptococci were isolated from the blood in 5 cases. They were much smaller than the hemolytic streptococci and did not as a rule affect

blood. Gram-negative diplococci were recovered from the blood in 1 case, from the urine in 2 cases, and from the throat in 1 case. Large gram-positive diplococci were found in the blood in 3 cases, in the urine in 2 cases and in the throat in 1 case. Diphtheroid bacilli were recovered from the blood in 1 case, from the urine in 1 case and from the throat in 2 cases.

31. **Toxins of Intestinal Obstruction.**—Gurd's experiments prove that vascular disturbances, namely, venous stasis, are equally as potent as occlusion of the lumen in the development of a poisonous substance in the intestinal mucosa, and that the substance produced in this manner is likewise a splanchnic paralyzer. The development of the poisonous material depended exclusively on vascular disturbance of the gut wall in a number of animals which were operated on and the portal veins or its branches ligated. In all of these operated animals the same type of fluid, which possessed the same toxic properties as the fluids found in closed duodenal loops, was discovered.

Dogs in which the portal vein, or the branches thereof draining the upper half of the intestinal tract, was ligated, died regularly within fifteen to eighteen hours. The animals never completely recovered from the stupor of anesthesia and were frequently found dead in exactly the same position in the cage as when returned from the operating room. The intestines, pancreas, and kidneys were found deeply cyanosed and the heart blood unduly fluid. The lumen of the intestine contained fluid blood-stained material, as a rule of a more watery consistency and deeper purple color than that found in cases of gut occlusion. The intestinal contents were collected from such animals and the cyanosed mucosa scraped off and placed in saline solution under toluol for extraction. Since the mucosa itself appears to contain a greater content of the toxic principle than does the content of the lumen, it would appear that the substance responsible for the intoxicating symptoms is the result of tissue autolysis rather than a bacterial product.

Gurd says it remains to be proven whether the death of the individual in cases of portal obstruction is due to the absence of the liver activity or to the development and absorption of the intestinal toxin, or of a combination of these two factors, and his experiments indicate that the effect on the nutrition of the intestine may be a sufficient cause for the untoward manifestations.

33. **Bovine Mastitis and Human Streptococci.**—The authors claim that hemolytic streptococci of human origin may cause mastitis, lasting for several weeks in cows. This time roughly corresponds to the duration of milk-borne epidemics. The streptococci may gain entrance through an abraded or injured surface of the teat. It appears possible, therefore, for mastitis in cows to be produced by an infection from the milker whose hands are contaminated perhaps from a sore throat. Mastitis results promptly when the cocci are injected directly into the udder by means of a catheter. The mastitis may exist without physical evidence. A caked bag may not occur, though pus and streptococci in large numbers are being secreted in the milk. Stringy, ropy, or gargety milk may or may not occur during the course of the mastitis.

In order to detect such infections, it might be necessary to examine milk from each quarter for bacteria and for pus. This may explain the failure to detect the source of the streptococci in some of the epidemics of sore throat. No change was noted by Davis and Capps in the cultural or pathogenic properties of the streptococci after growing in the udder of a cow for four weeks. The presence of various contaminating bacteria tend to inhibit the growth of hemolytic streptococci in milk.

35. **Purpura with Bacillus Mucosus in Blood.**—Clinically, the case studied by Weil and McMeans was a progressively severe bacteriemia in which cultures of the *bacillus lactis aerogenes* were obtained during life from the blood, urine and prostatic secretion. Purpura, although a late manifestation, was the result of this infection. On account of the systemic reactions after each surgical interference (passing sounds), of the urethra, the authors feel convinced that this was the point of entrance of the infection into the bloodstream. The authors suggest that probably infection of the genito-urinary tract by bacteria of the mucosus group is more common than is realized.

38. **Quinin Treatment of Rabies.**—The quinin treatment was tested by Cumming against fixed virus, as well as, against street virus. The former was a six-day virus, while the latter killed rabbits in about ten days, and guinea-pigs in eight days. The virus was given intracranially; the bisulphate of quinin was used in all experiments, the injections being intraperitoneal. The results were negative. The experiments were controlled both as to the infectivity of the virus and as to the absence, for the most part, of untoward symptoms from the quinin treatment. The dose of virus in most of the tests was not much larger than the smallest infecting dose. This amount of the virus is approximately 1/200,000 part of the total virus in the brain and spinal cord of a rabbit at the beginning of the paralytic stage. Inasmuch as the quinin failed as a preventive measure against extremely small doses of virus in actual tests, Cumming asks whether it cannot reasonably be assumed that this method of treatment is of no curative value in cases of hydrophobia manifesting symptoms in which the amount of virus would be many thousand times greater? In the absence of protection by quinin against small doses of virus, even when a series of daily injections of quinin is given preliminary to the injection of rabic virus, Cumming says, we cannot expect favorable results from quinin after symptoms of hydrophobia have developed.

40. **Vaccines in Experimental Streptococcal Arthritis.**—Concentrated antistreptococcus serum was prepared by Moore according to the methods employed in preparing concentrated diphtheria antitoxin. Fifty-two strains of streptococci were used including viridans and hemolyticus, as well as strains from cases of epidemic sore throat. The strains were isolated from patients having tonsillitis, alone or complicated with acute or chronic arthritis, endocarditis, serositis, nephritis and pyorrhea. The virulence of many strains was tested on rabbits; thirty-four produced acute or chronic arthritis in these animals. Four series of rabbits were injected with this serum: (a) after the establishment of acute arthritis; (b) immediately after receiving live streptococci; (c) before the injection of the live streptococci; and (d) before and again after receiving the living streptococci. In none of these groups did the concentrated serum appear to have any preventive or curative effect on the acute arthritis. Experimental streptococcal arthritis was either prevented by, or ran a much milder course after, prophylactic injections of a homologous streptococcus vaccine. An immunity was produced which persisted over forty days in at least one case. The immunity appeared to be intimately associated with, and probably dependent on, the production of opsonins. Endocarditis and nephritis were less frequent in the vaccine-treated rabbits than in the controls.

Journal of Outdoor Life, New York

August, XI, No. 8, pp. 225-255

43 Schoolchild Problems in Tuberculosis. F. H. Mann, New York.
44 *Fresh Air and Proper Food in Treatment of Tuberculosis. G. L. Bellis, Oak Forest, Ill.
45 *Problem of Infection in Tuberculous Families. J. B. Hawes, 2d, Boston.
46 Before and After-Care of Tuberculous. E. Hochhauser, New York.

44. **Fresh Air and Proper Food in Treatment of Tuberculosis.**—All substances Bellis considers proper food for the tuberculous patient that supplies in an easily digestible form and in sufficient quantities all of the elements that go to make up a normal, healthy human being. To promote the eating and digestion of the various materials represented by the classification constitutes the problem of the physician or institution, that would assist nature to the utmost in combating tuberculosis. Primitive man lived in the great out-of-doors and appeased his hunger with such substances as were most easily obtained. Cookery was an unknown art and it may be more than a mere incident that infectious

diseases have multiplied in direct ratio to the extent with which the human race have demanded that the life of food be destroyed by fire before being eaten.

In this age of so-called civilization, people, sick or well, insist that what they eat must appeal to their senses of taste and sight, rather than to a clear complete knowledge of what constitutes nutritious and digestible food. It is somewhat doubtful, says Bellis, if we could return suddenly and completely to the food of primitive man without dire consequences. In the present day we are forced to compromise in the matter of food. The individual patient's taste, digestion, and power of elimination must be considered, together with the economics of the problem. The great majority of persons ill with tuberculosis, and other diseases as well, are finicky in their choice of food. Misdirected sympathy and "mollycoddling" by parents, neighbors, friends, and too often physicians, are responsible for this state of affairs.

The food to be consumed must be rich in those principles most essential to metabolism. Milk stands at the head of the list, for it contains in goodly proportions all of the required elements. Occasionally the taste of milk is repulsive. Where this objection is present, the flavor of the milk can be easily changed by the addition of any one of the numerous spices and extracts. The products of milk, butter and cheese are also exceedingly nutritious. Bellis places eggs second on the list. In their raw state they are especially rich in albumen and fat, easily digested, and ordinarily readily obtained. Beef occupies third place. Raw beef Bellis believes to be a most valuable substitute for raw eggs. Pork in the form of breakfast bacon and ham, the former for its fat content, and both for the intestinal antiseptics which are introduced in their curing, must not be forgotten. Next in importance is a generous mixed diet of vegetables. Not alone because of the very nutritious properties of many of them, especially the cereals and legumens, but also on account of the desirable addition of fats in the form of cream, oils, butter and suet used in their preparation. Coarse vegetables act as a "scrubbing brush" to the entire alimentary canal, cleansing it and stimulating the flow of the digestive juices. The fruits come under this heading and when eaten at appropriate times furnish to the body many elements of great value. Because of their laxative properties, fruits will obviate the necessity for pills in the dietary of many individuals.

45. **Family Tuberculosis Infection.**—Tuberculosis infection takes place chiefly in childhood years in the intimate contact of family life. There are three classes of tuberculous, says Hawes, which are the chief sources of family infection, the unknown case, the known case treated in his own home, and the returned sanatorium or hospital patient. The last class of returned sanatorium patients is the most important one and best repays our efforts. The responsibility of the State toward its patients, Hawes states, does not end when the patient is discharged nor does the responsibility of the municipality end when the patient leaves for a State sanatorium. Cooperation between State and local forces must be constantly striven for. Tuberculosis is primarily a local problem but the State may well direct and advise but not replace local work.

Hawes' paper is based on a study of 600 patients, discharged from various State sanatoriums. The great majority of them, approximately 83 per cent. were in the advanced or moderately advanced stages of the disease at entrance to the sanatoriums, while nearly 50 per cent. were discharged with positive sputum and with the disease still active. These 600 patients, including in these figures only the immediate members of the family, exposed 2,601 others to this disease. Of these 2,601 individuals, only 597 or 23 per cent. had ever been examined for tuberculosis, despite the fact that at the patient's admission to the sanatorium his physician as well as the local board of health were at once notified so that the other members of the family might be examined. Of these 597 exposed patients who were examined, 75 or 12½ per cent. were found to be positive cases of tuberculosis. There were 966 children, 15 years and under among those exposed individuals. Of these 362 or 38 per cent. had been examined and 38 or 10½ per cent. found to be positive cases.

The aims in Massachusetts are to have a trained social worker in each institution. It will be the duty of such a person to become acquainted with the patients, devoting her attention especially to those about to leave, finding out their plans for the future and preparing the way for them. In addition to this there should be one or more field workers for each institution. The work on behalf of the State will be to direct and encourage such local work.

Journal-Lancet

July 15, XXXIV, No. 14, pp. 371-398

47 Work of the Medical Profession. F. A. Spafford, Flandreau, S. D.
48 Relation of Sanitation to Death and Disease. H. W. Hill, St. Paul.

August 1, XXXIX, No. 15, pp. 339-424

49 Nursing as Profession. G. D. Head, Minneapolis.

Lancet-Clinic, Cincinnati

August 1, CXII, No. 5, pp. 117-140

50 Conservation of Hearing Function. W. C. Phillips, New York.
51 Causative Factors in Mental and Nervous Diseases. J. C. George, Dayton.
52 Surgical Disorders of Digestion. W. D. Haines, Cincinnati.

August 8, CXII, No. 6, pp. 141-168

53 Surgery in Relation to Life Insurance. W. J. Mayo, Rochester, N. Y.
54 Abuse of the Obstetrical Forceps. J. W. Rowe, Cincinnati.
55 Torticollis. H. H. Hoppe, Cincinnati.

Medical Record, New York

August 15, LXXXVI, No. 7, pp. 279-320

56 Present Estimate of the Value of Radium in Surgery. R. Abbe, New York.
57 Trichinosis, with Report of Fifteen Cases. M. H. Sicard, New York.
58 Case of Phlebitis of the Penis, Simulating Edema Induratum, Complicating Acute Gonorrhea. M. Zigler, New York.
59 Tonsillectomy, Its Indications and Choice of Operation. W. H. Huntington, Washington, D. C.
60 Bacillus Coli Infections in Infancy and Early Life. W. M. Hartshorn, New York.
61 Ulcus Cruris Inveteratum. W. P. Cunningham, New York.
62 The End of Life. C. R. Green, Troy, N. Y.

Military Surgeon, Chicago

August, XXXV, No. 2, pp. 101-210

63 Sanitary Service of Maneuver Camps. J. H. Ford, U. S. Army.
64 Proposed Methods of Pitching and Striking Pyramidal, Small Pyramidal and Ward Tents. W. W. Reno, U. S. Army.
65 Investigation Relative to Life Cycle, Breeding, and Some Practical Means of Reducing the Multiplication of Flies in Camp. H. C. Michie, U. S. Army.
66 Relation of Army Surgeon to Civilian Surgeon. H. C. Coe, U. S. Army.

Oklahoma State Medical Association Journal, Muskogee

August, VII, No. 3, pp. 79-109

67 Relationship of Nervous Diseases to Venereal Diseases. J. W. Duke, Guthrie.
68 State Health Problems. J. C. Mahr, Oklahoma City.
69 Puerperal Infection. C. R. Hume, Anadarko.
70 Treatment of Puerperal Sepsis. W. A. Fowler, Oklahoma City.
71 Intestinal Obstruction. M. H. Foster, Alderson.

Southern Medical Journal, Mobile, Ala.

August, VII, No. 8, pp. 605-680

72 Early Diagnosis in Malarial Infections. G. E. Henson, Jacksonville, Fla.
73 Pituitary Disturbance as Related to Some Cases of Epilepsy, Psychoses, Personality and Other Obscure Problems. B. R. Tucker, Richmond, Va.
74 Use of Pituitary Extract in Obstetrics. F. W. Wilkerson, Montgomery, Ala.
75 Diagnosis of Certain "Stomach Cases." A. G. Brown, Jr., Richmond, Va.
76 Hyperchlorhydria. C. Stanley, Washington, D. C.
77 Effects of Alcohol on Mental and Nervous Diseases. H. S. Ward, Birmingham, Ala.
78 Some Physical Reasons Why We Are What We Are. G. H. Benton, Miami, Fla.
79 Fissure in Ano or Painful Ulcer. C. D. Render, Birmingham, Ala.
80 Relation of the Medical Profession to Accident Insurance. W. E. Magruder, Baltimore.
81 *Ovariotomy Sub-Partu. W. Kohlmann, New Orleans.
82 Congenital Pyloric Stenosis with Report of Cases. L. S. Booker, Durham, N. C.

83 Use of Iodin in the Abdomen; Report of Eight Cases. J. G. Gaither, Hopkinsville, Ky.
84 *Elimination of the Preventable Seven Per Cent. Mortality in the Surgical Treatment of Acute Abdominal Diseases. F. G. Du Bose, Selma, Ala.
85 Appendiceal Abscess—A Clinical Study. J. L. Campbell, Atlanta, Ga.
86 Iodin Technic in Surgery. W. H. Wilder, Birmingham, Ala.
87 Case of Sub-Temporal Decompression for Relief of Intra-Cranial Pressure of Obscure Origin: Recovery. G. T. Tyler, Jr., Greenville, S. C.
88 Complications of Submucous Resection of the Nose. W. L. Simpson, Memphis, Tenn.
89 Epithelioma Following a Pterygium. R. Fagin, Memphis, Tenn.

81. Abstracted in THE JOURNAL, Dec. 20, p. 2270.

84. Surgical Treatment of Acute Abdominal Diseases.—Du Bose summarizes his paper as follows: 1. There is a preventable death-rate of approximately 7 per cent. in acute abdominal diseases. 2. To overcome this a diagnosis of at least the presence of an acute abdominal condition must be made at the first visit or less than twelve hours after its onset. 3. To appreciate that early operation is the safest of all treatment. That the measures advised by the advocates of masterly inactivity are never safe, are a last resort, to be used only on those unreasoning people who refuse surgery, or on those who are seen late in the disease, and on these only until they can be brought to a hospital and have had operative relief. 4. To stop teaching and reporting statistics of cases treated by the expectant plans without paralleling such records with those in which immediate diagnosis and prompt surgical operations are done and a comparison of results in each series. 5. To encourage a more intimate relation with the internist and have him witness operations and there study the living pathology. 6. To let surgeons and internists appreciate the fact that the symptoms are not always in direct ratio to the severity of the unseen pathologic process.

West Virginia Medical Journal, Wheeling

August, IX, No. 2, pp. 41-74

90 Typhoid Fever and Illegal Practitioners vs. State of West Virginia. W. W. Golden, Parkersburg.
91 Acute Diarrhea of Children. W. Geston, Parkersburg.
92 Inflammations of Nasal Accessory Sinuses. H. H. Haynes, Clarksburg.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Children's Diseases, London

July, XI, No. 127, pp. 289-336

1 *Intramuscular Injections of Antitoxin in Treatment of Diphtheria. J. D. Rolleston and C. MacLeod.
2 Salvarsan and Neosalvarsan in Treatment of Hereditary Syphilis. J. L. Bunch.
3 Case of Mesenteric Thrombosis in Youth Originating from Caseating Tuberculous Gland. H. L. Murray.

1. Intramuscular Injections of Antitoxin.—Intramuscular have entirely supplanted subcutaneous injections of diphtheria antitoxin at the Grove Hospital. Without preliminary washing the outer side of the thigh in its middle third is painted with 2 per cent. solution of iodin, the needle is driven deep into the body of the vastus externus, and the injection is given in the ordinary way. Twenty thousand units (= 50 c.c.) can readily be injected even in small children, but the authors have never exceeded this dose at one time. Their youngest patient, aged 2 weeks, received 4,000 units for nasal diphtheria without any ill-effects. Directly the needle has been withdrawn after injection, the site of puncture is again painted with the iodin solution and a collodion scab is applied.

The thigh is preferred to the gluteal region not only because there is less probability of injuring important vessels or nerves but also because the thigh muscles are much more compact and exercise greater pressure on the injected fluid, rendering absorption more rapid. Not only is the actual injection much less painful, but the subsequent pain which often causes a restless night and persists for two or three days after subcutaneous injection, is ill-marked and often entirely absent. It is superior to the intravenous method, not only in the greater simplicity of its technic, but also in the less rapid excretion of antitoxin after injection. The more rapid absorption of antitoxin by the intramuscular route is shown, not by the effect on the faucial or laryngeal process, but by the lesser incidence of paralysis, especially of a severe kind.

British Medical Journal, London

August 1, II, No. 2796, pp. 221-276

4 On the Making of a Scottish Medical School. A. Ogston.
5 *Medicine from the Chemical Standpoint. A. E. Garrod.
6 *Surgeon of the Future. J. Bland-Sutton.

5. Medicine from the Chemical Standpoint.—After touching on the foundations of medicine, the progress of chemical science and biochemistry, Garrod discusses generally, the investigations made into the proteins and other compounds, the specificity of chemical structure, the metabolic activities of the living organism, the regulation of metabolism, inborn errors of metabolism, protective mechanisms against toxic agents, metabolic disturbances due to disease of organs, deficiency diseases, influence of chemical knowledge on the practice of medicine, chemistry in diagnosis, dietetics, therapeutics, empiric and scientific. Concluding, he says, that the reason the progress of medicine has been more rapid in recent years than ever before is due to the cumulative advance of science as a whole. Modern physics and chemistry, and the borderland science of physical chemistry, have rendered possible modern physiology and pathology, and on the foundation thus provided is being raised the stately edifice of a modern medicine, in which the scientific spirit shall have freer play than heretofore.

6. Surgeon of the Future.—Speaking of the surgeon of the future, Bland-Sutton says that surgeons are of two types: they are either craftsmen or biologists. The surgical craftsman invents variations in technic—metal plates, wires and screws for bones; or fancy methods of suturing wounds. Some expend their ingenuity on surgical cutlery and improve the knives and needles. The utility of a simple tool such as the clip forceps is inestimable. In spite of much ingenuity among surgeons an ideal ligature material awaits discovery. Clever contrivances like the laryngoscope, bronchoscope and cystoscope have revolutionized special branches of surgery. Another useful instrument, the esophagoscope, requires for its successful use a surgeon with the instincts of the sword swallower and the eye of a hawk.

The biologic surgeon studies pathology in its broadest aspect and investigates, in the laboratory, problems of morbid anatomy and bacteriology. The diagnostic value of reports issued from the laboratory by the pathologist and the bacteriologist, to be of value, must be estimated with the help of clinical experience. If the surgeon has had no experience in bacteriologic methods he must accept the reports from the laboratory with the hopefulness of a patient swallowing physic compounded from a prescription he does not understand and which he is often unable to read. The training of surgeons in clinical pathology is of great importance, and it requires little foresight to recognize that for men ambitious to attain high places in surgery the high road lies through the pathological institute.

Dublin Journal of Medical Science

July, III, No. 511, pp. 1-80

7 Experiences with Wassermann Reaction. E. J. McWeeny.
8 *Clinical Report of the Rotunda Hospital for One Year, November 1, 1912 to October 31, 1913. H. Jellett, D. G. Madill, R. M. Allen.
9 Etiologic Controversy anent Beriberi with Some Remarks as to Milled Rice. H. D. King.

8. Clinical Report of Rotunda Hospital.—The Hospital Staff of the Rotunda Hospital attended 4,136 labors from November, 1912, to November, 1913, with a mortality of 0.41. Seven deaths occurred in the extern department, eleven deaths in the intern department. Four deaths were the result of septic infection, one the result of accidental hemorrhage, one the result of unavoidable hemorrhage, and one the result of pulmonary embolus. There were twelve cases of unavoid-

able hemorrhage. Three mothers died—one of pyemia with thrombosis of the right ovarian vein. In the second case—one of central placenta praevia—bipolar version was performed, but the patient collapsed immediately after. The postmortem examination showed fatty degeneration of the heart. There was no hemorrhage after the version was completed. The third death also occurred in a case of central placenta praevia at term. There had been intermittent hemorrhage for four weeks before admission. Bipolar version was performed, and the patient delivered herself spontaneously four hours later. The postmortem examination showed that there was a tear of the cervix involving the bladder.

There were 24 cases of contracted pelvis. In four cases delivery was spontaneous. In 5 cases the forceps were applied, and delivery effected. In 2 cases, internal podalic version was performed. In 1 case, the child was extracted as a breech presentation. In 7 cases, cesarean section was performed, and in three cases pubiotomy was performed. Two patients died after cesarean section, both from septic poisoning. In one case of pubiotomy, the piece of bone between the saw-cut and the symphysis came away during the puerperium. This occurrence made not the smallest difference to the patient's power of walking. If anything, she walked better, and at an earlier date, than do the average number of pubiotomy patients. This patient subsequently delivered herself spontaneously in the hospital. There were 13 cases of prolapse and presentation of the cord. Five children were born alive, and 8 were born dead. There were only 5 cases of eclampsia. All the mothers recovered, and 4 children out of 6 were born alive. The forceps was applied in 64 cases. All the mothers recovered, and 54 children were born alive.

Lancet, London

August 1, II, No. 4744, pp. 281-358

10 *On Gastric Ulcer with Special Reference to Its Treatment by Gastrostomy. W. W. Cheyne.
11 Selection of Method of Operation in Treatment of Gastric and Duodenal Ulcers. A. von Eiselsberg.
12 *Internal Derangements of the Knee. R. Jones.
13 Results of Operation (Laryngo-Fissure) for Intrinsic Cancer of Larynx. E. Schmiegelow.
14 Hyperthyroidism: Primary and Late Results of Operation. C. H. Mayo.
15 Typhoid Perforation. G. E. Armstrong.
16 Treatment of Inoperable Carcinoma of the Uterus by Application of Heat. J. F. Percy.
17 Factors of Safety in Cleft-Palate Surgery. J. R. Eastman.
18 *Suture of the Levator Ani Muscle in Perineorrhaphy Operations. H. Jellett.
19 *Results of Radical Operative Treatment of Cancer of the Uterus. T. Wilson.

10. **Gastric Ulcer Treated by Gastrostomy.** — Cheyne believes that the question of gastrostomy is worth while considering in cases of adherent ulcers nearer the pyloric end which cannot be excised, in preference to gastro-enterostomy and closure of the pylorus. The advantages are very great. In the case of stricture of the urethra the quickest way of getting rid of the induration of the walls is to tie in a catheter for a few days and it seems to Cheyne, that the same result would probably follow in an indurated ulcer of the stomach. He would, of course, combine infolding of the ulcer with the gastrostomy whenever possible. While gastrostomy has not previously been suggested as a method of treating gastric ulcer, jejunostomy has been carried out in a considerable number of cases of ulcer of the duodenum on much the same principles, but although it has its warm advocates the idea does not seem to have taken hold. It seems to Cheyne that jejunostomy for duodenal ulcer does not possess the advantages that gastrostomy offers in the case of certain gastric ulcers. Ulcer in the duodenum seems to set up, and keep up, hyperchlorhydria and movements of the stomach and this may continue even though the patient is fed through a jejunostomy opening. Cheyne suggests that even in cases of duodenal ulcer, a gastrostomy with passage of the tube well down the duodenum, combined with infolding of the ulcer, might act better than jejunostomy, and might possibly take the place of gastro-enterostomy and occlusion of the pylorus in cases in which the infolding of the ulcer did not produce serious constriction of the lumen of the duodenum.

In a case cited there was an ulcer of considerable size on the posterior surface of the stomach, high up near the cardiac end and firmly adherent to the parts behind, and on the anterior wall of the stomach at the same point there was also a commencing contact ulcer. The conditions were most unfavorable for excision. What Cheyne did, therefore, was to leave the ulcer alone and to perform gastrostomy beyond the ulcer by Witzel's method, pushing the catheter through the pylorus and for about 3 inches along the duodenum. The patient was fed through the tube very soon after the operation, and the tube was left *in situ* for six weeks, when it was removed and the wound allowed to heal up. No food was given by the mouth for five weeks. The immediate result of the operation was that the patient at once lost all pain and discomfort from which she had previously suffered, and rapidly began to put on flesh and regain strength, and there was no trouble about the wound which healed in a few days, except, where the tube passed down to the stomach. When tested with food by the mouth at the end of five weeks no discomfort was caused, and on leaving out the tube a week later the wound closed in a few days and since then she has had no further trouble.

12. **Internal Derangements of the Knee.**—Speaking of luxation of the internal semilunar cartilage, Jones says that he refuses to operate in any case which he sees immediately after the first displacement, as so large a proportion of such cases get well under appropriate treatment, nor does he encourage operation in cases in which the recurrent trouble is painless and is never followed by effusion into the joint. He strongly advocates operation in cases in which the recurrence is sometimes followed by acute symptoms and encourages it in all recurrent cases in which a strenuous athletic life is a means of livelihood or a physical necessity. Operation is a positive necessity in the case of men who work among moving machinery or stand in positions in which a yielding knee may mean disaster. He has operated on patients from 12 to 60 years; age, therefore, is not a contra-indication. An argument in favor of operation is the occurrence of tubercle and so-called rheumatoid trouble as a direct result of the irritation of a displaced cartilage. Further, a knee which has been the seat of trauma is very susceptible to infection, and he is, therefore, careful not to operate during the presence of effusion nor to move it during operation for fear of the ingress of air or dust.

18. **Suture of the Levator Ani Muscle.**—The essential features of the operation devised by Jellett are: (1) The careful dissection of the necessary amount of vaginal mucous membrane off the rectum; (2) the exposure and suture of the separated levator ani muscles; and (3) the careful approximation of the cut edges of the vaginal mucous membrane in such a manner as to leave no projection or redundancy. The operation is carried out as follows: The extent of the perineal tear is carefully determined, and its anterior edges are marked out by bullet forceps. A third bullet forceps is applied to the perineal skin just behind the posterior edge of the tear. The position of the separated edges of the levator ani is determined by palpation through the mucous membrane of the vagina. An incision is then made from side to side along the line of junction of the skin and the vaginal mucous membrane. This incision cuts through the skin and any underlying scar tissue. A flap of vaginal wall is then dissected up off the underlying rectum. At its lowest part it is firmly held to the rectum and the sphincter ani by cicatricial bands, the result of the old cicatricial healing. As soon, however, as these have been cut through the separation of the remainder of the flap by blunt dissection is an easy matter.

When the dissection of the flap is complete a triangular space is exposed, which is bounded laterally below by the remains of the superficial vaginal and perineal muscles, and at a deeper level by the pubo-coccygeal fibers of the levator

ani muscle, while its floor is formed by the rectum. It is then an easy matter to catch the edges of the levator with clip forceps or dissecting forceps, and to draw them downward and inward until they meet in the middle line. If the separation and atrophy of the muscle are marked, then it may not be possible to draw the edges down sufficiently, but in the great majority of cases they can be brought into view. Three or four interrupted sutures of catgut are then passed through them from side to side, so that when tied they will approximate them in the middle line; for the present, however, they are left untied.

The next step is to trim the vaginal flap into proper shape, so that when the operation is complete there may be no redundancy. The cut edges of the flap are then brought together by a continuous catgut suture passed from above downward, and ending at the vulvar orifice. This being done, the catgut sutures in the levator muscle may be tied. The last step consists in the introduction of silkworm gut sutures passed so as to close the skin edges of the perineal wound. These sutures are passed from side to side, and traverse the skin and the remains of the superficial perineal muscles and also the elevator muscle, so as to supplement the buried catgut sutures. Any bleeding vessel, if of large size, should be caught and tied, but, as a rule, the best method of stopping bleeding is by proceeding rapidly with the operation.

19. **Treatment of Cancer of the Uterus.**—From 1896 until Dec. 31, 1913, Wilson operated on 596 cases of uterine cancer. Of these, in 67 the disease affected the uterine body. Among the 67, 15 vaginal hysterectomies with no mortality, and 29 abdominal hysterectomies with 3 deaths, were performed. Until the end of 1913 there were 529 cases of cancer of the cervix uteri. These can be conveniently divided into two groups according as operation by the vaginal or the abdominal route was the method of choice. In the first period, lasting until the end of 1905, there were 246 cases of which 37 were operated on by the vaginal method with one death, and 7 by the abdominal route with 6 deaths. In the second period, from Jan. 1, 1906, to Dec. 31, 1913, 283 cases were seen, among whom 20 were operated on by the vaginal route with no deaths and 72 by the abdominal with 8 deaths. The total immediate mortality of the vaginal method has been 57 cases with one death, or less than 2 per cent.; and of the abdominal, 79 operations with 14 deaths or 17.7 per cent. The great majority of abdominal hysterectomies were performed by Wertheim's method. The ratio of operability has steadily increased; in the years 1896 to 1899 it was 14 per cent.; in the last four years it has been more than 36 per cent.

The total five year results up to June 30, 1909, have been investigated and show that, with an increased operable ratio and the adoption of the abdominal method of operation the absolute curability of Wilson's cases have risen from 5.5 to 10.2 per cent. Of the patients surviving operation 16 of 51=31 per cent. of the vaginal, and 10 of 23=43 per cent. of the abdominal, remained well and free from recurrence for five years and upward.

Annales de la Société Med.-Chir. de Liége

LIII, Nos. 1-6, pp. 1-126

20 *Intermittent Crippling Contracture of Various Muscles Except Those of Face and Chest in Otherwise Healthy Young Man. (Myotonie acquise.) L. Beco.
21 Present Status of Operative Treatment of Glaucoma. L. Weekers.
22 *Is Operative Treatment Required for Small Bullet Wounds of Chest or Abdomen? Lenger, L. Delrez and C. Tecqmenne.
23 Perforated Duodenal Ulcer; Five Cases. C. Tecqmenne.
24 Importance of Radiography in Diagnosis of Renal Tuberculosis. Rogge.
25 Stenosis of the Pylorus with Hematemesis in Three-Weeks' Babe; Recovery after Posterior Gastro-Enterostomy. A. Hougardy.
26 *Divergent Dislocation of the Metatarsus. Lenger.
27 *Megacolon. (Maladie de Hirschsprung.) M. Dubois.
28 Roentgenoscopy of the Stomach and Intestines. (Examen du tube digestif aux rayons X.) Bienfait.

20. **Acquired Myotonia.**—The young man's general health in the case reported by Beco has not been impaired by the intermittent severe contracture of the various groups of muscles whenever he attempts to use them. He is robust and apparently free from inherited or acquired taint and had always been healthy until two abscesses developed on the right foot a year ago. The contractures occur even during sleep, but the sensibility and responses to electric tests are approximately normal. This justifies a more favorable prognosis than with ordinary myotonia, Beco adds.

22. **Gunshot Wounds of the Abdomen.**—Delrez and Lenger do not agree in their views on this subject. The latter advocates abstention as long as there are no signs of internal hemorrhage or other disturbance, while Delrez pleads for a prompt laparotomy with every bullet wound of the abdomen so as to ascertain and remedy any injury of the viscera. Each presents an array of cases which apparently sustain in turn each of the divergent views.

26. **Dislocation of the Metatarsus.**—Lenger remarks that divergent dislocation may almost be said to be merely the exaggeration of a physiologic movement. Reduction under a general anesthetic should be done at once if the dislocation is seen before the foot is swollen. When edema has developed, roentgenoscopy from the front and side may be necessary to ascertain the true condition. The main point in treatment is to restore the first metatarsal bone to place. When this is accomplished one can be content without attempting more. It might be imprudent to cut into the foot to restore the four other metatarsal bones to place. But if the first metatarsal bone cannot be reduced without operating, do not hesitate to expose it; it is possible that reduction of an intervening tendon may be all that is necessary. When the foot is crushed and amputation becomes necessary, if the first metatarsal bone can be saved, the functional use of the foot is retained and the gait not affected. This is because the foot is really made up of two parts, both triangular, a rear and internal tarso-metatarsal part, constituted by the seven bones of the tarsus and the first metatarsal bone. This is the strong arch of the foot, the arch of strength and movement; the arch rests on two supports: on the heel at the back and on the head of the first metatarsal bone in front. These two abutments support the weight of the body in walking and standing. The other part of the foot comprises the last four metatarsal bones, and it serves only to maintain the balance of the foot. Two tendons passing across the hollow of the foot define and separate the two parts. Lenger insists that the surgeon should feel that his task is done when he has succeeded in reproducing the arch of strength and movements. The rest of the foot can be left unmolested. Reexamination of one patient ten years after amputation of the last four metatarsal bones, run over by a wagon, shows perfect control of the foot. It is held and used normally, thanks to the preservation of the entire tarsus and the first metatarsal bone.

27. **Megacolon.**—Dubois' patient is a boy of nearly 12 with pronounced Hirschsprung's disease; extreme constipation had been the rule since early infancy, the stools were fluid, the peristalsis of the colon abnormally intense; the abdomen measured 71 cm. Of late there had been intermittent, more or less complete obstruction of the intestinal tract. Although the stools were fluid they were not abnormally frequent except when diarrhea alternated with inveterate constipation. Colitis is the rule, and there may be ulceration. The food should be such as to leave little waste, and the bowel should be rinsed out through a long soft tube with tepid water containing a teaspoonful of sodium bicarbonate and one of salt to the liter. This softens up impacted feces and promotes its expulsion; in his case the girth went down from 71 to 55 cm. in five days under this treatment. Dubois does not approve of operating on children under 5 except in emergencies. In the cases on record operative treatment on 14 infants was followed by 100 per cent. mortality; in 28 between 2 and 5, the mortality was 40 per cent.; in 46 between 5 and 15, it was 26 per cent.; in 41 between 15 and 50, it was 27 per cent. and in 14 patients over 50, it was 85 per cent. Colostomy should be merely the first step of the more complex operation. Taking up a fold in the colon,

fixation or colostomy are incomplete and do not do much good, and resection at one sitting is dangerous. Unilateral exclusion and implanting the ileum in the sigmoid loop is much better in most cases.

Bulletin de l'Académie de Médecine, Paris

LXXVIII, Nos. 26-28, pp. 879-994 and 1-61. Concluded from p. 611

29 Gratifying Results of Special Training for Certain Mentally Defective Children. (Adaptation s.ciale des enfants psychoanormaux éducables.) J. Roubinovitch.
30 *Improvement of Myxedematous Boy of 14 after Graft of Monkey's Thyroid. (Greffe de la glande thyroide d'un singe à un enfant atteint de myxedème.) Voronoff.
31 *Ascaris in Pyopneumothorax; Eighth Case on Record. R. Blanchard and M. Letous.
32 Morphin Acted on by Yeast as Analgesic. (Analgésie obstétricale.) Ribemont-Dessaignes, Bazy and Bourquelot.
33 Liver Lesions with Amebas Seven and Eighteen Years after Latent Infection; Two Cases. (Amibiase hépatique tardive de forme nodulaire.) C. Achard and C. Foix.

30. **Graft of Monkey's Thyroid Improves Myxedema.**—Voronoff's patient was a boy of 14 who had developed myxedema after measles at the age of 8. The graft of the right lobe of the thyroid with its parathyroids was taken from a large monkey—a baboon—and implanted in the neck of the boy. It was embedded in a vascular region and was sutured closely to the surrounding tissues in order to promote adhesions and formation of new vessels. Voronoff states that during the six months since, the gradual improvement in both the physical and the mental condition has been striking. The boy had formerly been apathetic and stupid, the skin scaling off, the nose and lips enlarged; all this has retrogressed and the features show nothing abnormal while from his former apathy in school the boy has become lively and unruly.

31. **Ascaris in Pyopneumothorax.**—A robust country woman was taken suddenly with pains suggesting pleurisy and puncture later revealed fetid pus. After a purge she passed two ascarides. As the pyopneumothorax persisted in spite of treatment, the pleura was opened and a macerated ascaris was found in the pus. Recovery was soon complete showing that there could not have been a fistula at any point.

Journal de Médecine de Bordeaux

July 19, LXXXV, No. 29, pp. 485-498

34 Neosalvarsan in Syphilitic Keratitis. C. Fromaget.
35 *Tardy Equivalents in Gastric Pathology. R. C. Augistrou.

35. **Tardy Equivalents in Gastric Pathology.**—Augistrou gives the details of 7 cases in which there were various disturbances coming on two or three hours after a meal, but not the usual train of pains relieved by vomiting, with the painful point in the back when food is ingested. Instead of this familiar syndrome, his patients had various disturbances which he regards as the recurring equivalents of the above syndrome. Five of them at this time after meals became dizzy and extremely depressed with tremor and profuse sweating, some feeling that death was impending. Two had besides recurring pain in the shoulder and arm or lower part of the chest. In only 2 of the 7 cases were the patients relieved by taking food, and one by vomiting. In only 2 cases was the stomach region tender during the acute phase. In 2 cases, however, there was a history of the typical tardy gastric pain in former years. In another case the atypical disturbances described above progressed to become finally the true typical attacks. One case was peculiarly instructive as the typical and atypical disturbances alternated, all coming on at the same hour after eating, the reflex pains and the general reaction at one time and another day the intense pain localized in the stomach.

Some of the patients had been treated for months in vain with drugs to act on the nerves and neuralgia, but a cure was soon complete when the diet was restricted to milk and egg dishes, with some alkaline powder. The gastric juice may be secreted in excess or there may be a deficit; the only reliable differential signs are the regularity of the interval after eating when the disturbances appear and their subsiding again; the regular recurrence for a few days to two weeks or more, and the usually complete cure under the simplest dietetic measures. The trouble is not hyperchlorhydria but merely abnormal sensitiveness of the gastric mucosa or spasm of the pylorus in persons with an unstable nervous system. All the above patients were what he calls inveterate neuropaths, great talkers, easily moved to tears or anger, and often complaining of headache and not feeling well in the morning.

Journal d'Urologie, Paris

July 15, VI, No. 1, pp. 1-152

36 *Anuria from Relics of Old Pelvic Inflammation. (Des anuries de cause indéterminée.) P. Bazy.
37 *Reflux of Urine into Ureter; Four Cases. (Reflux urétéral acquis.) O. Pasteau.
38 *Suburethral Abscess in Women. (Abcès urineux chez la femme.) P. Héresco and M. Cealic.
39 *Syphilitic Lesions in the Bladder. (Syphilis vésicale.) G. Gayet and Favre.
40 *Restoration of the Bladder. R. Grégoire.
41 *Modified Technic for Perineal Prostatectomy for Cancer. R. Proust.

36. **Anuria from Indeterminate Cause.**—Bazy reports several cases of anuria apparently ascribable to a calculus but nothing of the kind could be found, and the course of the cases showed that the trouble was some mechanical obstruction of the ureter, but not from stones, neoplasms or inflammatory processes. In the first case a man of 73 had had kidney colic and passed gravel at various times. The ureter evidently became dilated and stretched during the course of this nephrolithiasis, with the consequence that it became kinked low down and anuria resulted. Roentgenoscopy showed some vague shadows which suggested calculi in the pelvic ureter but which must have been of other origin. These misleading shadows were noticed also in two other cases of anuria in all of which concrements were incriminated but finally they had to be exculpated. Decapsulation of the kidney in one case started instantaneously the natural flow of urine. These "false calculi" are generally multiple and bilateral; the organs and soft parts in which they are located are movable, and hence the false calculi can be displaced in their relative positions. They are evidently relics of old inflammation in the pelvis and may drag on or kink the ureter in time.

37. **Reflux of Urine into Ureter.**—Pasteau does not refer to a congenital dilation of the ureter but to an acquired permanent gaping of the pathologic ureter mouth, or to a transient gaping. He describes a case of the latter in which an opaque fluid in the bladder was forced up into an apparently normal ureter between the spurts of urine from the ureter. The other ureter and kidney were tuberculous. After nephrectomy there was no further reflux in the other ureter, demonstrating that there had been no anatomic lesion but merely transient atony of the musculature. The danger is imminent of infection of the sound kidney from the reflux thus invited; it is further favored by the abnormally powerful contractions of the secondarily inflamed bladder. Another point to be borne in mind is the possibility of blundering in the diagnosis when from the ureter urine is drawn that came from the bladder instead of the kidney.

38. **Suburethral Abscess in Women.**—Héresco and Cealic report four cases of abscess on the median line just below the urethra in which the pus was mixed with urine, all the features of the suppuration corresponding to the analogous urinary fistulas in men.

39. **Syphilis of the Bladder.**—Gayet and Favre give a colored plate of the findings in three cases. The hematuric cystitis subsided so promptly under treatment for syphilis that there can be no question, they declare, of the specific nature of the bladder trouble. The hematuria came on suddenly and was profuse in each case, recurring, uninfluenced by local measures, at nearly every micturition, with more or less pain. The cystoscopic findings illustrated show various phases of syphilitic affections of the bladder. When they have progressed to ulceration, secondary infection blurs the clinical picture. The trouble usually is differentiated only by exclusion after the failure of ordinary measures.

40. **Restoration of Bladder.**—Grégoire thinks that the case he reports is the first to be published in which a new bladder was made from the rectum for extensive destruction of the vesicovaginal wall without exstrophy or cancer of the bladder. This is the fifth case in which this technic has been applied. Continence of urine was not secured in any instance but the results of the operation otherwise were satisfactory.

41. **Modified Perineal Prostatectomy.**—Proust's technic is profusely illustrated, featuring his method of locating the ureter where it crosses the vas deferens. Following the latter up to the seminal vesicles on each side, separating these from the bladder and turning them over backwards, exposes the region below so that access to the ureters is rendered simple by following along the vas on each side.

Lyon Médical

July 19, XLVI, No. 29, pp. 97-140

42 Nephropexy for Movable Kidney. G. Gayet.

Presse Médicale, Paris

July 25, XXII, No. 59, pp. 565-576

43 *Comparison of Phthalein-Test Findings with Excretion of Urea in Chronic Nephritis. (L'épreuve de la Phénolsulfonephthaléine.) F. Widal, A. Weill and P. V. Radot.
44 Convoluted Thickening of the Scalp. (Pachydermie vorticellée du cuir chevelu.) Malartic and Opin.

43. **Phthalein Test and Urea Excretion.**—Widal, Weill and Radot state that with the phthalein test, the Ambard formula and tests for urea in the blood-serum, remarkably parallel findings were obtained with all. They list them from a number of cases, the figures all rising and falling together, both in normal persons and in patients with Bright's disease as also in patients with both heart and kidney disease but not oliguria. This parallelism confirms the precision of the various tests and favors the choice of the simplest technic which is that of the phthalein test. They remark in addition that this latter technic is free from the sources of error to which the others are liable. As it gives the same results as the Ambard formula they should be interpreted in the same way.

They distinguish between true azotemia, that is, retention from progressive accumulation of urea in the body fluids, and the azotemia which is merely the result of some disturbance in the excretion of urea which is borne for a long time without the urea accumulating in the body fluids. The fluctuating urea content of the blood serum in these cases is of no import for diagnosis or prognosis unless considered by means of the phthalein test or Ambard formula. This reveals the slightest upset in excretion of urea, and confirms the assumption of an underlying kidney lesion in case of incipient or abortive Bright's disease.

Revue de Médecine, Paris

July, XXXIV, No. 7, pp. 473-552

45 Advantages of Dried Peas and Beans in Antidiabetic Diet. (Les cures de légumes secs dans le diabète.) M. Labbé.
46 Traumatic Shock or Traumatic Asthenia. R. Benon.
47 Edema with Liver Disease. (Les hépatites hydropigènes.) P. Le Dumany.
48 Sciatica from Affections of the Spinal Nerve Roots. Fine Therapeutic Effects of Mineral Mud-Baths. M. Dobrokhotow.

Revue Médicale de la Suisse Romande, Geneva

July 20, XXXIV, No. 7, pp. 449-500

49 Mode of Action of Mineral Waters. de Senarclens.
50 *Ventrofixation of Retroflexed Gravid Uterus. O. J. Rapin.
51 Operative Treatment of Gonorrheal Epididymitis. C. G. Cumston.

50. **Ventrofixation of Retroflexed Gravid Uterus.**—The woman of 40 had complained for a year of symptoms suggesting retroflexion of the uterus. They had developed after a fall, and they became much aggravated by the second month of pregnancy. After failure of all other measures, Rapin slipped his hand back of the uterus through a laparotomy incision, detached numerous adhesions, brought the uterus up into place and held it with two silk sutures through the median line of the abdominal wall. Pregnancy continued unmolested to normal term.

Revue Pratique d'Obstétrique et de Gynécologie, Paris

June, XXII, No. 6, pp. 161-188

52 Intravenous Colloidal Metal Injections in Puerperal Fever. R. Willette.
53 Ether Dressings in Gynecology. R. Condamin.

Semaine Médicale, Paris

July 8, XXXIV, No. 27, pp. 313-324

54 Prevailing Views on Surgical Shock. R. de Bovic.
55 *Chronic Appendicitis and Torsion of the Omentum. F. Lejars.

July 22, No. 29, pp. 337-348

56 *Signs of Organic Hemiplegia. J. Lhermitte.

55. **Chronic Appendicitis and Torsion of Omentum.**—Lejars relates a case which shows that adhesion and partial torsion of the omentum or even of one strand of fibers may entail symptoms suggesting chronic appendicitis. The omentum trouble is generally traceable to mischief in the appendix, possibly many years before. In his case twenty-two years had elapsed after a brief and mild attack of appendicitis, leaving chronic slight tenderness, when the man of 39 suddenly developed new symptoms and the operation revealed the omentum adherent to the nearly normal appendix, the stretched adherent strip twisted several times on itself. This and the few similar cases on record teach the importance of examining the omentum even to quite a distance at all appendix operations.

56. **Signs of Organic Hemiplegia.**—Lhermitte discusses the phenomena characteristic of organic hemiplegia to which Panski, Babinski and Bergmark have recently called attention. Even although we already have many signs of organic hemiplegia, yet these *symptomes de luxe* are important not only because they aid in excluding functional trouble but also because they throw light on the pathologic physiology of the syndrome. They show that ordinary hemiplegia is an infinitely more complex manifestation than was formerly recognized. Not only the apparatus innervated by the centers in the region injured suffer from the disturbance in the centers (deficit phenomena), but other apparatus connected with them suffer likewise, either from loss of control (in which case anarchy prevails among them), or from excessive control of inhibition (phenomena of dissociation or Monakow's diaschisis). Among the comparatively new signs revealing trouble of this kind is the excessive secretion of saliva, the heavy coating of the tongue, sometimes only on the paralyzed side, profuse excretion of urea crystals stopping short at the median line, and a modified sense of taste or smell on the paralyzed side. This may be bilateral, and it may explain the loss of appetite in some cases. The sphincters may act in an anarchistic way, and enuresis may be the only sign left of a transient, possibly scarcely noticed, hemiplegia. This anarchy of the sphincter may be exaggerated or brought back by changes in temperature, by sneezing or coughing. In one case irresistible micturition occurs every time the hemiplegic takes his place at the table. Panski has also reported recently three cases in which glycosuria disappeared after organic hemiplegia developed. One woman of 60 had 5 per cent. sugar in the urine before but there was none afterward for a year, not even after subsidence of the hemiplegia, and it did not run above 2 per cent. at any time. In the others it never reappeared, or only at long intervals. Babinski applies the term *anosognosie* to a peculiar modification of the consciousness which he has noted in two cases, namely, the complete ignoring or the semblance of completely ignoring the fact of the hemiplegia. The patients seemed absolutely unaware of their infirmity although otherwise they were intelligent.

Archiv für Gynaekologie, Berlin

CIII, No. 1, pp. 1-242. Last indexed July 4, p. 67

57 Infantile Hypoplasia of Uterus Frequently Masks Serious Pathologic Processes or Their Relics. (Tuberkulose, Uterusatresie und Amenorrhoe.) J. Schiffmann.
58 General Anesthesia in Gynecology. H. Schlimpert. Continued.
59 Muscular Degeneration Causing Spontaneous Rupture of Uterus at Term. G. v. Mandach.
60 The Corpus Luteum in Ovulation and Menstruation. (Corpus luteum menstruationis und Corpus luteum graviditatis.) A. Marcotty.

61 Case of Deforming Fibrous Ostitis with Extensive Tumors in Bones. P. Sippel.
62 Changes in Blood during Delivery, Lactation and the First Menses Thereafter. L. Terhola.
63 Further Improved Technic for Treatment of Genital Prolapse. (Die Suspension der Portio vaginalis an den Sakrouterin-Ligamenten.) E. Wertheim.
64 Toxicity of Urine, Serum and Colostrum during Pregnancy, Delivery and the Puerperium Not Proportional to Clinical Picture in Eclampsia. P. Werner and E. Kolisch.

Berliner klinische Wochenschrift

July 20, LI, No. 29, pp. 1349-1396

63 Effectual Inoculation against Diphtheria. (Die Diphtherieschutzimpfung von Säuglingen nach v. Behring.) P. Rohmer.
66 Experimental Pneumonia. (Eine Methode zur experimentellen Erzeugung von Pneumonie und einige mit dieser Methode erzielte Ergebnisse.) S. J. Meltzer (New York).
67 *Foerster's Operation in Treatment of Spastic Paralysis. T. Gümbel.
68 Residuum in Stomach Later than Six Hours with Gastric Ulcer Remote from the Pylorus. (Zur Frage des Sechsstundenrestes bei pylorusfernem Ulcus ventriculi.) Faulhaber.
69 Carbonated Baths. (Einige Gesichtspunkte für die Beurteilung von Kohlensäurebädern.) W. Scheffer.
70 *Atypical Gout and Allied Metabolic Disturbances. Goldscheider. Commenced in No. 28.
71 *Relations between the Thymus and Exophthalmic Goiter. H. Matti. Commenced in No. 28.

67. **Section of Spinal Roots for Spastic Paralysis.**—Gümbel has compiled 107 cases in which Foerster's operation has been done for Little's disease. The mortality was 13 per cent. He has operated himself in 8 cases, here described in detail. One patient died and the outcome was injuriously affected in one case by an intercurrent hip-joint disease. The results were disappointing in all; none of the patients is able to use his legs although painstaking after-care followed the operations. Better results are obtained in spastic paralysis with the ordinary measures. A still further drawback of the operation is that the laminectomy left a weakness of the spine. In one of his cases the tendency to curvature of the spine became much aggravated and in 2 others curvature developed in previously straight spines.

70. **Disturbances Resulting from a Tendency to Atypical Gout.**—The first part of Goldscheider's article was reviewed in these columns August 15, abstract 58, p. 613. He describes here a number of typical cases of atypical gout and allied metabolic disturbances all of which call for treatment similar to that for true, typical gout. The importance of the subject lies in the unrecognized or overlooked fact that a number of symptoms on the part of the nervous and circulatory systems and the kidneys are the result of metabolic disturbances analogous to or identical with those of gout. These may be due to an inherited tendency, to overwork, or to lack of exercise. Treatment of the metabolic disturbances applied in time and systematically is liable to give highly gratifying results. The groups of the atypical forms of gout include persons with a gritting noise in the joints, with or without tophi; obesity; congestion in the liver; kidney stones and gravel and nephritis. He found gout in 163 of 424 obese patients; the symptoms were much the same in all. Pains in the joints were more common in the obese with high blood-pressure. He found typical or atypical gout further in 30.1 per cent. of 232 cases of enlarged liver in the non-obese. In 4.9 per cent. there was a tendency to kidney stones, and among those with cardiovascular symptoms the proportion was 10 per cent.

It seems plausible to assume that symptoms on the part of the cardiovascular system, nerves, etc., in these cases are due to deranged or insufficient metabolism of purins or to excessive intake of purins beyond what can be properly metabolized, or to the inherited tendency underlying the constitutional obesity, or to an upset in the liver control of metabolism. Goldscheider's aim is to emphasize the importance of a deranged metabolism as a factor in cardiovascular, nervous and renal phenomena. He admits that the only proof he has to offer for some of his statements is the success of treatment based thereon.

71. **The Thymus with Exophthalmic Goiter.**—Matti's research and study of the literature confirm that the thymus is often directly concerned in the production of exophthalmic goiter. The monopoly hitherto enjoyed by the thyroid is at an end. The adrenals often are insufficient in this disease and epinephrin may be indicated to prepare the patient for operative treatment. The changes in the thymus in exophthalmic goiter are not to compensate for the thyroid, but are directly coordinated with and parallel to the changes in the thyroid.

Correspondenz-Blatt für Schweizer Aerzte, Basel

July 18, XLIV, No. 29, pp. 897-928

72 *Atrophy of the Prostate. A. Müller.
73 Endemic Goiter. (Zum Krofproblem.) E. Bircher.

72. **Atrophy of the Prostate.**—Müller remarks that comparatively few realize that retention of urine may be the consequence of atrophy of the prostate as well as of hypertrophy. An abnormally small prostate may cause a clinical picture in every respect similar to that from enlargement of the organ. It sometimes happens that the syndrome is ascribed to nervous incompetency of the bladder as the anticipated enlargement of the prostate is not discovered. He had two typical cases of the kind which he here describes in detail and compares with analogous experiences on record. The disturbances are caused not by obstruction from enlargement of the gland but from derangement of the functioning of the bladder sphincter which is involved more or less in the shriveling process. The suprapubic incision permits better oversight and is to be preferred in these cases. Differential diagnosis is difficult mainly in that all bladder disturbances of central origin, especially tabes, have to be excluded before positively incriminating atrophy of the prostate. In some cases hypertrophy of one part was accompanied by atrophy of the rest or there may be a true miniature hypertrophy. Stretching the prostate, or the Bottini operation, or resection of the sphincter may cure the trouble after failure of medical measures. He compares the various technics in vogue, especially Young's conservative operation, which he describes in detail, remarking that he does not know of its having been applied to date to any extent in Europe.

Deutsche medizinische Wochenschrift, Berlin

July 23, XL, No. 30, pp. 1505-1552

74 *Treatment of Acute Threatening Conditions with Pneumothorax. J. Grober.
75 Cultivation of Parasite of Rabies. (Züchtung des Lyssavirus nach H. Noguchi.) R. Kraus and B. Barbara.
76 Pharmacology of Colloid Solutions. (Die vitale Färbung mit sauren Farbstoffen in ihrer Bedeutung für pharmakologische Probleme.) H. M. Evans, W. Schulemann and F. Wilborn.
77 *Agglutination Titer in Infectious Diseases. C. Klieneberger.
78 Experiences with Rosenbach's Tuberculin. A. Mayer.
79 *Treatment of Diarrhea by Anesthetics by the Mouth. M. Henius.
80 Chronic Copper Poisoning from Alloy Filling of Tooth. (Chronische Kupfervergiftung durch das Tragen von schlechter Goldlegierung im Munde.) E. Harnack.
81 Sore Tongue and Gums as Early Symptom of Pernicious Anemia. H. Stern (New York).
82 The Pulse Wave with Disease of Aorta. (Brachialis-Wellenschreibung.) Engelen.
83 Serodiagnosis. (Untersuchungen zum Abderhaldenverfahren.) L. Nieszytka.
84 *Induced Hardening of Ligaments Cures Flat-Foot, etc. (Gerbung der Bänder zur Heilung des Plattfusses und anderer Knochendeformitäten.) M. Katzenstein.
85 *Neuropathic Equivalents in Infants. M. Wilhelm.
86 Tests for Urine Affected by Hexamethylenamin. (Vortäuschung von Eiweiss nach Hexamethylentetramin.) J. Schumacher.

74. **Threatening Conditions with Pneumothorax.**—Grober does not refer to induced artificial pneumothorax but to that complicating tuberculous processes or stab wounds or other injury of the lungs, when it is important to relieve vital organs from the pressure of the air. The air must be allowed to escape only very slowly, through a puncture needle and tube into a jar of water. Dry cups may relieve pain for hours at a time, and the patient may become accustomed to his pneumothorax until it no longer distresses him. But during the acute phase opiates may be necessary. By relieving the pain they permit deeper breathing and this helps to restore the circulation. Swallowing may be impeded by the displacement of the esophagus, and special care with the food is necessary on this account. Signs of sepsis may render puncture advisable even when there are no symptoms

from compression. Heart stimulants may be usefully combined with the opiates in some cases.

77. **Agglutination Titer in Infectious Diseases.**—Klieneberger has encountered eight cases of typhoid in the last two years in which agglutination occurred once at 1 to 2,560; three times at 1 to 10,240; twice at 81,920 and once at 1 to 163,840. These high titers did not last over many days. In some cases of paratyphoid infection, the serum agglutinated at 1 to 81,920 and kept this up for over four months. In pyocyaneus infection agglutination occurred at 1 to 40,960 in one case, but in two others only at 1 to 2,560. This same figure was obtained also in three proteus infection cases.

79. **Treatment of Diarrhea by Reducing Sensitiveness of the Stomach.**—Henius thinks that Fuld has hit the nail on the head by his statements in regard to "gastrogenous diarrhea," that is, diarrhea set up by a reflex action on the colon from the oversensitiveness of the stomach. Just as reflex vomiting can occur from this cause, reflex diarrhea may be started and maintained by it. Treatment should aim to soothe the irritable stomach. By deadening the sensibility of the stomach, the reflex action is arrested and the diarrhea is cured. Cocain may answer the purpose: ten drops of a 3 per cent. solution of cocain fifteen minutes before meals.

84. **Treatment of Flat-Foot by Induced Shriveling of Ligaments.**—Katzenstein induces hardening and shriveling of overstretched and relaxed ligaments responsible for flat-foot and other deformities. He discovered by accident the effectual action of the tanning process and then proceeded to apply it systematically. One of his cured patients is a youth of 15 who has been cured by this means of crippling and painful bilateral flat-foot disturbances. He does not even have to wear insoles now. Katzenstein uses formaldehyd for the purpose, injecting, for example, into the tibionavicular ligament from 0.5 to 1 c.c. of a weak solution of formaldehyd under local anesthesia. A plaster cast is then applied to hold the ligament in its shortened position. When the cast was removed after three or four weeks the ligament was firm and hard. He gives an illustration of an apparently almost normal child of 5 cured of extreme flat-foot and inward bowed legs. He injected the formaldehyd into the tibionavicular ligament and into the medial lateral ligament of each knee, with a plaster dressing for the three joints. He thinks that relaxed ligaments are the cause of deformity of bones far more often than is generally recognized. By detecting the loss of elasticity early it may be possible to ward off deformity and correct it by restoring the pull to the ligaments. This is a truly causal treatment of deformity and renders apparatus superfluous.

85. **Neuropathic Equivalents in Infants.**—Wilhelm relates the case of an infant of 8 months who died from pneumonia after an attack of diphtheria; for months previously it had had attacks of vomiting suggesting stenosis of the pylorus. As soon as the diphtheria developed, the vomiting stopped but began again after recovery, stopping anew as the pneumonia came on. Wilhelm suggests that the vomiting may have been a conditional reflex, and that this was arrested by the intercurrent disease. The vomiting occurred first in connection with some indigestion. The mother was extremely nervous and the inherited taint maintained the vomiting as a conditional reflex on the intake of food.

Jahrbuch für Kinderheilkunde, Berlin

July, LXXX, No. 1, pp. 1-132

87 Periodical Vomiting with Acetonemia. G. Hilliger.
88 Cause of the Physiologic Loss of Weight in the New-Born. (Physiologische Gewichtsabnahme neugeborener Kinder.) G. Benestad.
89 Adaptation of Cow's Milk for Infant Nutrition. (Versuche zur Anpassung der Kuhmilch an die Frauenmilch zu Zwecken der Säuglingsernährung.) E. Müller and E. Schloss.
90 *Development of New-Born White Rats when Separated from the Mother and Artificially Fed. H. Brüning.
91 Early Appearance of Centers of Ossification and Calcification in Hypoplastic Chondrodystrophia Fetalis. E. Conradi.

90. **Development of New-Born Animals under Artificial Feeding.**—Brüning found that young rats taken from the mother during the first few days of life and artificially fed on food rich either in albumin and fat or in carbohydrates were lighter and smaller at the end of the nursing period than those left with the mothers. Artificial feeding with food rich in fat and albumin immediately after weaning caused a marked and progressive increase in weight. Food rich in carbohydrate after weaning, on the contrary, caused a decrease in weight so that the animals on the forty-second day were about the size of half-grown mice. When the latter group were placed on a mixed diet they increased in weight but did not come up to the standard of the group fed with an abundance of fats and proteins. Roentgen examination did not show any changes in the bones. The intestinal canal of the animals fed on carbohydrates showed the type of the herbivora, and that of those fed on proteins the type of the carnivora. The former have little fat tissue while the latter are quite plump. There was no marked difference in the intestinal flora of the two groups, but there was a relative scarcity of bacteria in the upper part of the intestinal tract in both groups.

Münchener medizinische Wochenschrift, Berlin

July 21, LXI, No. 29, pp. 1601-1656

92 *Cure of Deep-Seated Cancers by Roentgen Exposure of Surface. (Heilung tiefliegender Karzinome durch Röntgenbestrahlung von der Körperoberfläche aus.) E. Bumm and K. Warnekros.
93 Curves to Record Skin Reaction to Tuberculin Tests. (Graphische Analyse kutaner Reaktionen.) C. v. Pirquet.
94 *Clinical and Experimental Experience with Salvarsan Injected into the Central Nervous System. W. Weygandt, A. Jakob and V. Kafka.
95 Dusting Wound with Anesthetic Powder before Suturing. (Daueranästhesie.) G. Hotz.
96 *Passive Transmission of Protective Ferments in Mental Disease. A. Fauser.
97 Two-Way Retention Catheter for Continuous Irrigation of Bladder and Kidney Pelvis. E. Holzbach.
98 *Severe Intestinal and Liver Trouble Set Up by Chronic Dyspepsia. (Chronische Magen- Darmdyspepsie, Colitis gravis und Leberzirrhose.) R. Schütz.
99 Operative Treatment for Cleft Palate. (Gaumenspalte.) R. Drachter.
100 Food as Cause and Cure of Disease. (Die Ernährung als Krankheitsursache und Heilfaktor.) Schittenhelm.

92. **Deep Cancers Cured by the Roentgen Rays.**—Bumm and Warnekros state that after disappointing extensive trials of mesothorium and other radio-active substances, they returned to roentgenotherapy with a modified technic, and here report two years of most encouraging experiences. The secret of success, they say, is to use hard tubes, by the cross-fire technic, to generate 500 X units in the depths. As about six-sevenths of the rays applied to the surface fail to penetrate to a depth of 10 cm., fully 3,500 X units have to be applied to the skin to obtain the 500 units in the focus. They state that no serious injury results from this intensive exposure of the skin to the exclusively hard rays, even with 800 X units. At worst, the skin may blister but this heals in three or four weeks, and a month of a transient local dermatitis is not to be considered when balanced against the cure of malignant disease. Seven cases of advanced cancer of the uterine cervix, fourteen of the breast and one of the lung are reported, all showing remarkable benefit under the exposures, even the microscope confirming the complete retrogression of the cancer, as they show by slides of excised scraps. The tissues became indurated, with hyaline degeneration of the connective tissue, and there was not a trace of cancer by the fifth week in one typical case of a bleeding carcinoma in the uterine cervix, as large as a man's fist, the patient aged 37. The rays were applied externally alone, the distance from the focus 10 or 15 cm., the daily exposure totaling 60 or 80 minutes, the different fields of exposure overlapping so that each was exposed from 90 to 120 minutes. In two weeks the growth had subsided by one-half and by the end of the third week the retrogression continued spontaneously after the close of the course of treatment.

In one case the interval since treatment has been over a year and the cure has persisted to date. The patient, a woman of 42, was already in advanced cachexia with dyspnea from an inoperable recurrence of cancer of the breast. The lymph-nodes in the axilla were much enlarged, both above

and below the clavicle, and adherent. This patient returns every two or three weeks for a prophylactic exposure. One great advantage of Roentgen treatment over the knife is that any lymph-nodes involved or other metastases, feel the curative influence of the rays on their way to the deeper focus. Ovarian cancers proved the hardest to influence in their experience but fine results were obtained in 2 cases with metastases left after panhysterectomy for ovarian cancer.

94. **Intraspinal Injection of Salvarsan.**—This article reports extensive experiments on monkeys treated with neosalvarsan injected directly into the central nervous system in doses relatively much larger than are used in the clinic and three times as concentrated. One monkey by lumbar puncture was given—proportional to its weight—thirty times the amount given to patients, and yet it showed no signs of anything wrong, kept clinically healthy, and only the microscope revealed slight and circumscribed histologic changes. The dose was 3 c.c. of a 0.15 per cent. solution. With stronger solutions injected into the spinal canal or brain the nervous tissue showed signs of severe irritation, especially in the vessel walls and the glia. The monkeys injected subdurally and into the spine even with large amounts of the solution used on patients (0.15 to 300) were not affected deleteriously in the slightest and even the microscope failed to reveal the slightest change. The article is accompanied by fourteen pictures of the microscopic findings under the intensive dosage. The results of the research are very encouraging for the mild intraspinal use of neosalvarsan in Gennerich's dosage, that is, not over 6 c.c. of a 0.15 to 300 solution. (See also Berlin Letter in THE JOURNAL, June 20, p. 1979.)

96. **Passive Transmission of the Defensive Ferments.**—Fauser injected ten rabbits with serum from patients with dementia precox. The serum digested ovarian tissue or testicle tissue according as it came from a woman or man, and this discriminating property seemed to be transmitted to the rabbits' serum.

98. **Dyspepsia, Colitis and Cirrhosis of the Liver.**—Schütz gives the details of four cases in which primary dyspepsia brought on serious inflammation in the colon. A tendency to spontaneous healing was evident in two cases, showing that even quite severe bowel trouble is liable to retrogress spontaneously. This explains the occasional appearance of pus in the stools of patients with dyspepsia who yet never develop severe enteritis; a mild attack passes over undetected. The modification of the intestinal flora by the abnormal digestive processes may be the chief factor in the colitis.

Zeitschrift für Kinderheilkunde, Berlin

July, XI, No. 4, pp. 267-336. Last indexed Aug. 22, p. 713

101 The Relation of Measles to Other Pathologic Processes. H. Koch.
102 Slight Erythrocyturia in Infancy and Childhood. Castro.
103 The Acidity of the Stomach Contents in Infancy and Childhood on Milk and Meat Test Diets. E. J. Huenekens.
104 Relation of the Heart Muscle to Spasmophilia in Early Childhood. K. Morgenstern.
105 Relation of Chronic Deficient Nourishment to Infection and the Clinical Signs of Decreased Immunity. E. Thomas.
106 Congenital Edema from Lymphangiectasis. B. Erlanger.

Zentralblatt für Gynäkologie, Leipsic

July 25, XXXVIII, No. 30, pp. 1049-1088

107 Conservative Treatment of Umbilical Hernia in the New-Born. (Heilung von Nabelschnurbrüchen.) F. Ahlfeld.
108 The Intra-Uterine Pessary in Treatment of Amenorrhea. (Zur Therapie der Amenorrhöe: Ein Wort für den Intrauterinstift.) Rieck.

Gazzetta degli Ospedali e delle Cliniche, Milan

July 19, XXXV, No. 86, pp. 897-912

109 Atypical Typhoid Fever. I. Illuminati.

July 21, No. 87, pp. 913-920

110 Exophthalmos as Early Sign of Meningitis. M. Zannini.

Rivista Ospedaliera, Rome

July 30, IV, No. 12, pp. 561-608

111 *Mercury Test for Tuberculous Nature of Effusion. (La reazione di Morelli negli essudati pleurici di natura tubercolare.) M. Zannini.
112 *Spastic Ileus. G. Cauli.
113 Ambard's Formula for Recording Functional Capacity of the Kidneys. (Cio che deve la chirurgia urinaria alla costante di Ambard.) R. Bastianelli.

111. **Mercury Test for Effusions.**—Zannini has been giving Morelli's test a thorough trial and found it extremely simple and reliable. He applied it in 13 cases of transudate and 35 of effusions, comparing the findings with those of the Rivalta test. In the 35 cases of effusions the Rivalta test was positive in all, but the Morelli test was negative in 15. Everything in these cases indicated a tuberculous process, confirming Morelli's assertion that effusions of tuberculous origin always respond negatively to the test. It is made by dropping three or four drops of the fluid into a glass filled with a saturated solution of mercuric chlorid. If the fluid is an effusion, a yellowish ring of mercury albuminate will form on the surface; it will either adhere to the walls of the vessel or it will sink to the bottom whole. This is the positive reaction. If the fluid is a transudate instead of an effusion, the mercury acting on the albumin forms numerous small flakes or granules which sink thus segregated to the bottom. This is the negative reaction.

112. **Spastic Ileus.**—Cauli discusses the present status of the conception of ileus from spasmodic contraction of some segment of the intestine and reports a case from his own practice. His patient was a robust boy of 17 with no pathologic antecedents. After ten days without bowel movement he developed severe abdominal pain and vomited incessantly. There did not seem to be any specially tender points but sometimes the pain seemed more intense to the right, below the umbilicus, and sometimes more in the left iliac fossa. He could not retain even a sip of ice water, and during the paroxysms of pain the pulse was small and frequent, the face drawn. After four days of these symptoms there came a lull, the lad feeling very much better and getting up, but the bowels did not move and he continued to vomit. No effect was realized from morphin and enemas and the pains returned, becoming so intense that operative relief became imperative. Nothing pathologic was found at the laparotomy except that the small intestine over a stretch 20 cm. long was contracted and also the descending colon and flexure, the segment not larger in diameter than one's little finger. Otherwise the viscera seemed normal; the intestines above the contracted segments were not much dilated. The abdomen was sutured without further intervention and the vomiting ceased and bowel functioning was restored after a few days.

Two days after his discharge from the hospital he returned with his old symptoms but in a milder form; he was kept under observation for a few weeks during which periods of complete well being alternated with periods of vomiting but the intestines moved freely. Treatment included opiates, atropin, hot applications and suggestion. No effect from the atropin could be detected. By the end of the sixth week after the first appearance of symptoms he was apparently entirely cured and has had no signs of trouble since. The good general condition during the intervals between the attacks of pain was noticeable; even when the vomiting and the occlusion of the bowels kept up, yet the lad felt well and his pulse was good during the intervals. This is the opposite to what is observed with true ileus.

Hospitalstidende, Copenhagen

July 15, LVII, No. 28, pp. 865-888

114 Necessity for Interrupting Pregnancy on Account of Progressing Pulmonary Tuberculosis; Six Cases. (Abortus provocatus ved Lungetuberkulose.) G. E. Permin.

Svenska Läkaresällskapets Handlingar, Stockholm

XL, No. 2, pp. 133-215

115 Criminal Responsibility. (Om den s. k. tillräkneligheten.) O. Kinberg.
116 Hemorrhagic Leptomeningitis from Anthrax Bacilli. H. Berglund.

Ugeskrift for Læger, Copenhagen

July 23, LXXVI, No. 30, pp. 1319-1362

117 Typical Roentgen-Ray Findings with Gastric Cancer. (Ventrikelcarcinomet i typiske Röntgenbilleder.) T. E. H. Thaysen.